INSTALLATION RESTORATION PROGRAM

REMEDIAL INVESTIGATION REPORT

MINNESOTA AIR NATIONAL GUARD BASE
DULUTH INTERNATIONAL AIRPORT
DULUTH, MINNESOTA
VOLUME 5



HAZWRAP SUPPORT CONTRACTOR OFFICE

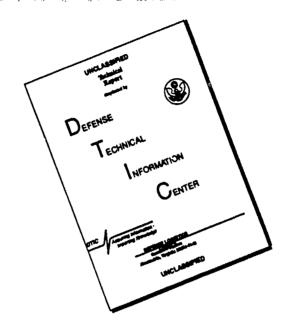
Oak Ridge, Tennessee 37831
Operated by MARTIN MARIETTA ENERGY SYSTEMS, INC.
For the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-840R21400

91 2 11

057

"This report has been prepared for the Martin Marietta Energy Systems, Inc. by Engineering-Science, Inc. for the purpose of aiding in the implementation of the Department of Defense Installation Restoration Program. It is not an endorsement of any product. The views expressed herein are those of the Contractor and do not necessarily reflect the official views of the publishing agency, the United States Air National Guard, nor the Department of Defense."

The state of the s



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

EPORT DOCEMENTATION AGE

199 No. 1 189 Signer group was the rest in equipment of sometiments with made to versite in the original popular of the extension of the ex BENCY USE ONLY (LIBOR BIBAR) 12. REPORT DATE 3. REPORT TITE AND DATES COVERED January 1990 Final Remedial Investigation Report Remedial Investigation Report 5. CINDING AUGISERS Minnesota Air National Guard Base Duluth International Airport Duluth, Minnesota Volume 1-final report i. AJINOR(S) N/A 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) 8. PERFORMING ORGANIZATION REPORT NUMBER Engineering-Science 710 South Illinois Ave., Suite F-103 Oak Ridge, TN 10. SPONSORING / MONITORING AGENCY REPORT NUMBER 9. SPONSORING/MONITORING AGENCY HAME(5) AND ADDRESS(ES) Hazardous Waste Remedial Actions Program Oak Ridge, TN Air National Guard Bureau Andrews Air Force Base, Maryland 2033 11. SUPPLEMENTARY HOLES Volume 2 - Appendices Volume 3 - Appendices Volume 4-Appendices Volume 5-Appendices Volume 6-Appendices Volume 7-Appendices 123. DISTRIBUTION / AVAILABILITY STATEMENT 12b. DISTRIBUTION CODE Approved for public release; distribution is unlimited - 13. ABSTRACT (Maximum 200 words) The report describes the remedial actions performed on sites confirmed to contain hazardous waste contamination which endangers the human health. The actions performed are described and the potential for future problems. The study was conducted under the Air National Guard's Installation Restoration Program. 14. EUSJECT TERMS 15. NUMBER OF PAGES Installation Restoration Program Remedial Investigation Report 15 PRICE CODE Minnesota Air National Guard TALE HECURITY CLASSIFICATION | 18. SECURITY CLASSIFICATION | 19. SECURITY CLASSIFICATION 120. LIMITATION OF ABSTRACT OF THIS PAGE OF ABSTRACT Unclassified

25N- 75-10-01-250-5500

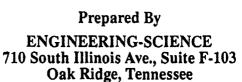
Chandard Horm Usa (Rev. 2-89) Charles of Exp. No. 17819

REMEDIAL INVESTIGATION REPORT

MINNESOTA AIR NATIONAL GUARD BASE DULUTH INTERATIONAL AIRPORT Duli, th, Minnesota

VOLUME 5

JANUARY 1990



Prepared For
HAZARDOUS WASTE
REMEDIAL ACTIONS PROGRAM
Oak Ridge, Tennessee



Acces	sion For				
NTIS	CRA&I	A			
	TAB				
U. an	nounced	Ē			
Justif	ication	-			
	By Dut ibution/ Availability Codes				
Dist	Avair und Spirelat	or			
A-1					

Submitted To

MINNESOTA AIR NATIONAL GUARD

Duluth International Airport

Duluth, Minnesota

This page intentionally left blank.

PREFACE

BEEN COMMENTERS OF STREET STREET

The second

A SAME AND A SAME AND

Engineering-Science (ES) entered into an agreement with the HAZWRAP Support Contractor office operated by Martin Marietta Energy Systems, Inc. for the U.S. Department of Energy (DOE) to perform a Remedial Investigation at the Minnesota Air National Guard Base, Duluth International Airport, Duluth, Minnesota, to be submitted to the National Guard Bureau, Andrews Air Force Base, Maryland. This investigation was initiated in July, 1988 under Task Order Y02, General Order 18B-97387C, which is under DOE contract DE-AC05-840R21400, with Martin Marietta Energy Systems under Interagency Agreement 1489-1489-A1. The overall objectives of this effort were to define the magnitude, extent, direction, and rate of movement of identified contaminants and to summarize the need for remedial actions based on an assessment of risks to human health and the environment.

This investigation was performed by Engineering-Science personnel from the Oak Ridge, Tennessee office with oversight provided by Martin Marietta Energy Systems. Mr. Larry Janssen, of Martin Marietta Energy Systems was the Technical Monitor for Lt. Col. Michael Washeleski of the National Guard Bureau. Major Joel D. Manns, Minnesota Air National Guard Base, Duluth, Minnesota, provided field support. Engineering-Science personnel included Mr. Robert S. McLeod, P.E., P.G., who served as Project Manager and Mr. John D. Hardeman, P.G., who served as the Field Team Leader. Mr. Robert L. Thoem, P.E. was the ES Technical Director for the project.

Engineering-Science wishes to acknowledge North Star Drilling, Little Falls, Minnesota as the drilling and well installation subcontractor. Salo Engineering, Duluth, Minnesota, provided professional surveying services. ES Berkeley Laboratory, Berkeley, California; ES Atlanta Laboratory, Atlanta, Georgia; MetaTrace, Inc., St. Louis, Missouri; NUS Corporation, Pittsburgh, Pennsylvania; and IT Radiological Sciences Laboratory, Oak Ridge, TN provided analytical laboratory services for sample analyses.

This work was accomplished between July 1988 and March 1989.

This page intentionally left blank.

TABLE OF CONTENTS VOLUME I

LIST OF I	FIGUR	ES	Page xvii
LIST OF T	ΓABLE	S	xxvii
EXECUT	IVE SU	JMMARY	ES-1
SECTION	1 INT	RODUCTION	1-1
1.1	PURI	POSE OF REPORT	1-4
	1.1.1	Description of Installation Restoration Program	1-4
	1.1.2	Report Organization	1-6
1.2		KGROUND OF DULUTH AIR NATIONAL RD BASE	1-7
	1.2.1	Description of Duluth Air National Guard Base 1.2.1.1 Physiography, Climate and Drainage 1.2.1.2 Demography and Land Use 1.2.1.3 Geology 1.2.1.4 Hydrogeology 1.2.1.5 Water Quality 1.2.1.6 Water Use	1-7 1-10 1-13 1-16 1-17 1-18 1-18
	1.2.2	History of Duluth Air National Guard Base	1-26
	1.2.3	Previous Investigations	1-26
	1.2.4	Description and History of Site 2 1.2.4.1 Description 1.2.4.2 History 1.2.4.3 Previous Investigations	1-30 1-30 1-31 1-33
	1.2.5	Description and History of Site 3 1.2.5.1 Description 1.2.5.2 History 1.2.5.3 Previous Investigations	1-37 1-37 1-43 1-43
	1.2.6	Description and History of Site 4 1.2.6.1 Description 1.2.6.2 History 1.2.6.3 Previous Investigations	1-45 1-53 1-53 1-53
	1.2.7	Description and History of Site 8	1-62
		1.2.7.1 Description 1.2.7.2 History 1.2.7.3 Previous Investigations	1-62 1-62 1-62

			Page
	1.2.8	Description and History of Site 10 1.2.8.1 Description 1.2.8.2 History 1.2.8.3 Previous Investigations	1-68 1-68 1-72 1-72
SECTION	2 REN	MEDIAL INVESTIGATION DESCRIPTION	2-1
2.1	AREA	A LOCATIONS	2-3
	2.1.1	Surface Feature Investigation	2-9
	2.1.2	Surface Water and Sediment Investigations 2.1.2.1 Background Surface Drainage Location 2.1.2.2 Airport Surface Drainage Locations	2-9 2-9 2-9
	2.1.3	Geological Investigation	2-12
	2.1.4	Soil Investigation	2-12
	2.1.5	Ground-Water Investigation 2.1.5.1 Water Level Investigation 2.1.5.2 Ground-Water Sampling Investigation	2-12 2-12 2-15
2.2	SITE	2	2-15
	2.2.1	Surface Feature Investigation	2-20
	2.2.2	Surface Water and Sediment Investigations	2-20
	2.2.3	Geologic Investigation	2-20
	2.2.4	Soil Investigation	2-20
	2.2.5	Ground-Water Investigation 2.2.5.1 Aquifer Investigation 2.2.5.2 Gound-Water Sampling Investigation	2-23 2-23 2-25
2.3	SITE	3	2-25
	2.3.1	Surface Feature Investigation	2-31
	2.3.2	Surface Water and Sediment Investigations	2-31
	2.3.3	Geologic Investigation	2-36
	2.3.4	Soil Investigations	2-36

				Page
	2.3.5	Ground- 2.3.5.1 2.3.5.2	Water Investigation Aquifer Investigation Ground-Water Sampling Investigation	2-38 2-38 2-41
2.4	SITE	4		2-41
	2.4.1	Surface 1	Feature Investigation	2-47
	2.4.2	Surface '	Water and Sediment Investigations	2-47
	2.4.3	Geologic	c Investigation	2-47
	2.4.4	Soil Inve	estigation	2-50
	2.4.5	Ground- 2.4.5.1 2.4.5.2	Water Investigation Aquifer Investigation Ground-Water Sampling Investigation	2-50 2-50 2-50
2.5	SITE	8		2-53
	2.5.1	Surface !	Feature Investigation	2-60
	2.5.2	Surface	Water and Sediment Investigations	2-60
	2.5.3	Geologie	c Investigation	2-60
	2.5.4	Soil Inve	estigations	2-63
	2.5.5	Ground- 2.5.5.1 2.5.5.2	Water Investigation Aquifer Investigation Ground-Water Sampling Investigation	2-63 2-63 2-66
2.6	SITE	10		2-66
	2.6.1	Surface	Feature Investigation	2-66
	2.6.2	Ground- 2.6.2.1 2.6.2.2	Water Investigation Aquifer Investigation Ground-Water Sampling Investigation	2-66 2-69 2-69
SECTION	3 INV	'ESTIGA'	TION RESULTS	3-1
3.1	AREA	A LOCAT	TIONS	3-3
	3.1.1	Surface	Features	3-3
	3.1.2	Surface	Water Hydrology	3-3

			Page
	3.1.3	Geology	3-7
	3.1.4	Hydrogeology	3-11
3.2	SITE	2	3-11
	3.2.1	Surface Features	3-11
	3.2.2	Surface Water Hydrology	3-18
	3.2.3	Geology	3-21
	3.2.4	Hydrogeology	3-22
3.3	SITE	3	3-29
	3.3.1	Surface Features	3-29
	3.3.2	Surface Water Hydrology	3-30
	3.3.3	Geology	3-30
	3.3.4	Hydrogeology	3-32
3.4	SITE	4	3-41
	3.4.1	Surface Features	3-41
	3.4.2	Surface Water Hydrology	3-41
	3.4 3	Geology	3-43
	3.4.4	Hydrogeology	3-44
3.5	SITE	8	3-48
	3.5.1	Surface Features	3-50
	3.5.2	Surface Water Hydrology	3-50
	3.5.3	Geology	3-50
	3.5.4	Hydrogeology	3-53
3.6	SITES	3 3, 4, 8	3-56
	3.6.1	Surface Features	3-56
	3.62	Surface Water Hydrology	3-56

			Page
	3.6.3	Geology	3-65
	3.6.4	Hydrogeology	3-67
3.7	SITE	10	3-72
	3.7.1	Surface Features	3-72
	3.7.2	Surface Water Hydrology	3-78
	3.7.3	Geology	3-78
	3.7.4	Hydrogeology	3-78
SECTION	4 NA	TURE AND EXTENT OF CONTAMINATION	4-1
4.1	DEFI	NITION OF BACKGROUND CONDITIONS	4-3
	4.1.1	Surface Water and Sediment Quality	4-4
	4.1.2	Soil Quality	4-4
	4.1.3	Ground-Water Quality	4-4
4.2		ORT AREA SURFACE WATER AND MENT SAMPLES	4-8
	4.2.1	Airport Area Surface Water and Sediment Quality	4-8
	4.2.2	Extent of Airport Area Contamination	4-11
4.3	NATU AT SI	JRE AND EXTENT OF CONTAMINATION TE 2	4-11
	4.3.1	Source of Contamination	4-14
	4.3.2	Surface Water and Sediment Contamination 4.3.2.1 Surface Water and Sediment Quality 4.3.2.2 Extent of Surface Water and Sediment	4-14 4-14
		Contamination	4-14
	4.3.3	Soil Contamination 4.3.3.1 Soil Quality	4-17 4-17
		4.3.3.2 Extent of Soil Contamination	4-21
	4.3.4	Ground-Water Contamination 4.3.4.1 Ground-Water Quality 4.3.4.2 Extent of Ground-water Contamination	4-21 4-21 4-24

			Page	
4.4	NATURE AND EXTENT OF CONTAMINATION AT SITE 3			
	4.4.1	Source of Contamination	4-29	
	4.4.2	Soil Gas Survey Results	4-29	
	4.4.3	Surface Water and Sediment Contamination 4.4.3.1 Surface Water and Sediment Quality 4.4.3.2 Extent of Surface Water and Sediment Contamination	4-29 4-30 4-35	
	4.4.4		4-35 4-35 4-43	
	4.4.5	Ground-Water Contamination 4.4.5.1 Ground-Water Quality 4.4.5.2 Extent of Ground-Water Contamination	4-44 4-44 4-46	
4.5	NATU AT SI	JRE AND EXTENT OF CONTAMINATION TE 4	4-51	
	4.5.1	Source of Contaminanation	4-51	
	4.5.2	Surface Water and Sediment Contamination 4.5.2.1 Surface Water and Sediment Quality 4.5.2.2 Extent of Sediment and Surface Water Contamination	4-51 4-51 4-56	
	4.5.3	Soil Contamination 4.5.3.1 Soil Quality 4.5.3.2 Extent of Soil Contamination	4-60 4-60 4-60	
	4.5.4	Ground-Water Contamination 4.5.4.1 Ground-Water Quality 4.5.4.2 Extent of Ground-Water Contamination	4-60 4-62 4-62	
4.6	NATU AT SI	JRE AND EXTENT OF CONTAMINATION TE 8	4-62	
	4.6.1	Source of Contamination	4-64	
	4.6.2	Surface Water and Sediment Contamination 4.6.2.1 Surface Water and Sediment Quality 4.6.2.2 Extent of Surface Water and Sediment	4-64 4-64	
		Contamination	4-64	

である。からし

ACTION ALL AREA (

				Page
	4.6.3	4.6.3.1	tamination Soil Quality Extent of Soil Contamination	4-64 4-64 4-69
	4.6.4	4.6.4.1	Water Contamination Ground-Water Quality Extent of Ground-Water Contamination	4-69 4-69 4-69
4.7	NATU AT SI		EXTENT OF CONTAMINATION	4-72
	4.7.1	Source o	f Contamination	4-72
	4.7.2	4.7.2.1	Water Contamination Ground-Water Quality Extent of Ground-Water Contamination	4-72 4-72 4-75
SECTION	5 CON	NTAMINA	NT FATE AND TRANSPORT	5-1
5.1	Introd 5.1.1 5.1.2	Contami	nant Fate nant Transport	5-3 5-3 5-5
5.2	CONT SITE		T FATE AND TRANSPORT AT	5-7
	5.2.1	Summar	y of Contaminants	5-7
	5.2.2	Potentia	Routes of Migration	5-7
	5.2.3	Contami	nant Persistence	5-8
	5.2.4	Contami 5.2.4.1 5.2.4.2 5.2.4.3		5-9 5-9 5-9 5-9
5.3	CONT SITE:		NT FATE AND TRANSPORT AT	5-10
	5.3.1	Summar	y of Contaminant	5-11
	5.3.2	Potentia	l Routes of Migration	5-11
	5.3.3	Contami	nant Persistence	5-12
	5.3.4	Contami 5.3.4.1 5.3.4.2 5.3.4.3		5-13 5-13 5-13 5-14

			Page
5.4	CONT AT SI	TAMINANT FATE AND TRANSPORT TE 4	5-15
	5.4.1	Summary of Contaminants	5-15
	5.4.2	Potential Routes of Migration	5-16
	5.4.3	Contaminant Persistence	5-16
	5.4.4	Contaminant Migration in Surface Water and Ground Water	5-17
5.5	CONT AT SI	FAMINANT FATE AND TRANSPORT TE 8	5-17
	5.5.1	Summary of Contaminants	5-17
	5.5.2	Potential Routes of Migration	5-17
	5.5.3	Contaminant Persistence	5-17
	5.5.4	Contaminant Mobility and Migration in Soil	5-18
5.6	CONT AT SI	5-18	
	5.6.1	Summary of Contaminants	5-18
	5.6.2	Potential Routes of Migration	5-18
	5.6.3	Contaminant Persistence	5-18
	5.6.4	Contaminant Mobility and Migration	5-18
SECTION	6 RIS	K ASSESSMENT	6-1
6.1	EVAI	LUATION METHODOLOGY	6-3
	6.1.1	Step 1 Selection of Indicator Chemicals	6-5
	6.1.2	Step 2 Estimation of Exposure Point Concentrations 6.1.2.1 Exposure Pathway Analysis 6.1.2.2 Exposure Point Concentrations 6.1.2.3 Applicable and Appropriate Requirements and Other Criteria	6-9 6-9 6-11 6-17
	6.1.3	Step 3 Estimation of Chemical Intakes 6.1.3.1 Fugitive Dust Generation Resulting	6-21
		from Wind Erosion	6-22

				Page
		6.1.3.2	Volatilization of Organic Compounds from Surface Water	6-24
		6.1.3.3 6.1.3.4	Dermal Contact with Surface Water Ingestion of Surface Water During	6-27
		6.1.3.5	Recreation Ingestion of Ground Water as Drinking	6-29
		6.1.3.6	Water Ingestion of Soil	6-30 6-31
	6.1.4	Step 4 T	oxicity Assessment	6-32
	6.1.5	Step 5 R 6.1.5.1 6.1.5.2	isk Characterization Noncarcinogenic Effects Potential Carcinogenic Effects	6-34 6-34 6-35
6.2	SITE	RISK A	SSESSMENT	6-36
	6.2.1	Selection	n of Indicator Chemicals	6-36
	6.2.2	Estimati Emission 6.2.2.1 6.2.2.2 6.2.2.3	on of Exposure Point Concentrations or n Rates Exposure Pathway Analysis Exposure Point Concentrations Comparison of Exposure Point Concentrations to ARARs	6-38 6-38 6-41 6-42
	6.2.3	Estimati	on of Chemical Intakes	6-44
	6.2.4	Toxicity	Assessment	6-44
	6.2.5	Risk Ch: 6.2.5.1	aracterization Risk Characterization of	6-45
		6.2.5.2	Noncarcinogenic Compounds Risk Characterization of Potentially Carcinogenic Compounds	6-45 6-45
6.3	SITE 3	RISK A	SSESSMENT	6-50
	6.3.1	Selection	n of Indicator Chemicals	6-50
	6.3.2	Estimati Emission 6.3.2.1 6.3.2.2 6.3.2.3	on of Exposure Point Concentrations or Rates Exposure Pathway Analysis Exposure Point Concentrations Comparison of Exposure Point Concentrations to ARARs	6-50 6-52 6-55 6-56
	6.3.3	Estimati	on of Chemical Intakes	6-58
	6.3.4	Toxicity	Assessment	6-58

				Page
	6.3.5	Risk Ch 6.3.5.1	aracterization Risk Characterization of	6-59
		6.3.5.2	Noncarcinogenic Compounds Risk Characterization of Potentially	6-59
			Carcinogenic Compounds	6-59
6.4	SITE	4 RISK A	SSESSMENT	6-62
	6.4.1	Selection	n of Indicator Chemicals	6-62
	6.4.2	Estimati Emission 6.4.2.1 6.4.2.2 6.4.2.3	ion of Exposure Point Concentrations or n Rates Exposure Pathway Analysis Exposure Point Concentrations Comparison of Exposure Point Concentrations to ARARs	6-62 6-62 6-69 6-71
	6.4.3	Estimati	ion of Chemical Intakes	6-72
	6.4.4	Toxicity	Assessment	6-72
	6.4.5	Risk Ch 6.4.5.1	aracterization Risk Characterization of	6-72
		6.4.5.2	Noncarcinogenic Compounds Risk Characterization of Potentially	6-73
		0.1.0.2	Carcinogenic Compounds	6-73
6.5	SITE	8 RISK A	SSESSMENT	6-73
	6.5.1	Selection	n of Indicator Chemicals	6-73
	6.5.2		ion of Exposure Point Concentrations sion Rates Exposure Pathway Analysis Exposure Point Concentrations Comparison of Exposure Point Concentrations to ARARs	6-73 6-79 6-82 6-82
	6.5.3	Estimati	ion of Chemical Intakes	6-83
	6.5.4	Toxicity Assessment		
	6.5.5	Risk Ch 6.5.5.1	aracterization Risk Characterization of	6-84
		6.5.5.2	Noncarcinogenic Compounds Risk Characterization of Potentially	6-84
		0.0,0,6	Carcinogenic Compounds	6-86
6.6	SUM	MARY A	ND CONCLUSIONS	6-86

- Winds

boundaries of

Characteristics I

Commercial C

		Page
SECTION 7	SUMMARY AND RECOMMENDATIONS	7-1
7.1 IN	TRODUCTION	7-1
7.2 SI	GNIFICANT CONTAMINATION AT SITE 2	7-8
7.3 SI	GNIFICANT CONTAMINATION AT SITE 3	7-9
7.4 SI	GNIFICANT CONTAMINATION AT SITE 4	7-11
7.5 SI	GNIFICANT CONTAMINATION AT SITE 8	7-12
7.6 SI	GNIFICANT CONTAMINATION AT SITE 10	7-12
	JMMARY OF SIGNIFICANT CONTAMINATION T ALL SITES	7-12
7.8 R	ECOMMENDATIONS	7-13
SECTION 8	REFERENCES	8-1
	VOLUME 2	
APPENDIX A	A DEFINITIONS, NOMENCLATURE AND UNITS OF MEASUREMENT	
APPENDIX I	S STATEMENT OF WORK	
APPENDIX (PROJECT TEAM BIOGRAPHICAL SUMMARIES	
APPENDIX I	PROCEDURES AND PROTOCOLS	
APPENDIX I	E DRILLING RECORDS	
APPENDIX I	WELL CONSTRUCTION RECORDS	
APPENDIX (G AQUIFER SLUG TEST ANALYSIS	
APPENDIX I	H ALTITUDE AND COORDINATE SURVEY FOR SAMPLING SITES	
APPENDIX I	GROUND-WATER LEVEL MEASUREMENT SU	MMARY
APPENDIX.	STREAMFLOW MEASUREMENT SUMMARY	
APPENDIX	K GRAIN SIZE ANALYSES	
APPENDIX I	CHEMICAL ANALYSES RESULTS FOR SOIL, GROUND WATER, SURFACE WATER AND SEDIMENT SAMPLES	

TABLE OF CONTENTS (continued) VOLUME 3

APPENDIX M LABORATORY DATA AND QUALITY ASSURANCE FORMS, DATA PACKAGES #1 THROUGH #12

VOLUME 4

APPENDIX M LABORATORY DATA AND QUALITY ASSURANCE FORMS, DATA PACKAGES #13 THROUGH #25

VOLUME 5 of this report consists of VOLUME 9

APPENDIX M: LABORATORY DATA AND QUALITY ASSURANCE FORMS, DATA PACKAGES #26 THROUGH #41?

VOLUME 6

APPENDIX M LABORATORY DATA AND QUALITY ASSURANCE FORMS, DATA PACKAGES #42 THROUGH #68

VOLUME 7

APPENDIX N QA REPORT FOR SAMPLE ANALYSES RESULTS

APPENDIX O SOIL GAS RESULTS

APPENDIX P RISK ASSESSMENT TABLES

APPENDIX Q FIELD NOTEBOOKS AND DRILLING LOGS

of water wells and ground water and listed in data tables. Data of pesticides and chemical contamination in soils and in runoff from watersheds is also listed.

LIST OF FIGURES

	•	Page
1-1	Location Map.	1-8
1-2	Site Vicinity Map.	1-9
1-3	Airport Configuration.	1-12
1-4	St. Louis River Watershed.	1-15
1-5	Location Scheme for Water Wells in the State of Minnesota.	1-20
1-6	Sites Defined and Ranked During IRP Phase I Study.	1-29
1-7	Aerial Photograph of Site 2, April 1988.	1-32
1-8	Site 2 Sampling Locations Utilized During Phase II Investigations.	1-35
1-9	Aerial Photograph of Site 3, April 1988.	1-38
1-10	Site 3 Sampling Locations Utilized During Phase II Investigations.	1-47
1-11	Aerial Photograph of Site 4, April 1988.	1-54
1-12	Site 4 Sampling Locations Utilized During Phase II Investigations.	1-57
1-13	Aerial Photograph of Site 8, April 1988.	1-64
1-14	Site 8 Sampling Locations Utilized During Phase II, Stage 2 Investigations.	1-65
1-15	Site 10 Aerial Photograph, April 1988.	1-70
1-16	Site 10 Sampling Locations Utilized During Phase II, Stage 2 Investigation.	1-73
2-1	Airport Area Sampling Locations Utilized During Remedial Investigations.	2-5
2-2	Site 2 Boreholes, Surface Locations and Trenched Area of Remedial Investigation.	2-16
2-3	Site 2 Sampling Locations Utilized During Remedial Investigation	2-17
2-4	Site 3 Boreholes, Surface Locations, and Surveyed Soil Gas Grid Points of Remedial Investigation.	2-26
2-5	Site 3 Soil Gas and Shallow Soil Sample Locations.	2-27

LIST OF FIGURES (continued)

		Page
2-6	Site 3 Monitoring Wells Utilized During Remedial Investigation.	2-28
2-7	Site 4 Sampling Locations Established During Remedial Investigation.	2-43
2-8	Site 4 Sampling Locations Utilized During Remedial Investigation.	2-44
2-9	Site 8 Sampling Locations Established During Remedial Investigation.	2-55
2-10	Site 8 Sampling Locations Utilized During Remedial Investigation.	2-56
3-1	Aerial Photograph of the Airport Area, August 1952.	3-5
3-2	Lithologic Logs From Paired Well Points at Site 2.	3-8
3-3	Lithologic Logs From Paired Well Points at Site 8.	3-9
3-4	Bedrock Contour Map of the Airport Area.	3-10
3-5	Geologic Cross-Sections of the Airport Area.	3-13
3-6	Index to Cross-Sections of the Airport Area.	3-14
3-7	Aerial Photograph of Site 2, August 1952.	3-15
3-8	Aerial Photograph of Site 2, October 1965.	3-16
3-9	Aerial Photograph of Site 2, May 1979.	3-17
3-10	Surface Drainage of Site 2.	3-20
3-11	Index to Cross-Section Locations for Site 2.	3-23
3-12	Geologic Cross-Sections for Site 2.	3-24
3-13	Water Table and Direction of Ground Water Movement at Site 2.	3-25
3-14	Variation in Vertical Hydraulic Head in the Glacial Till at Site 2 and Generalized Direction of Ground-Water Movement.	3-26
3-15	Surface Drainage of Site 3.	3-31
3-16	Index to Cross-Sections for Sites 3, 4, and 8.	3-34
3-17	Geologic Cross-Sections for Site 3.	3-35

LIST OF FIGURES (continued)

		Page
3-18	Water Table and Direction of Ground Water Movement for Site 3.	3-38
3-19	Variation in Vertical Hydraulic Head in the Glacial Till at Site 3 and Generalized Direction of Ground-Water Movement.	3-39
3-20	Surface Drainage at Site 4.	3-42
3-21	Geologic Cross-Sections for Site 4.	3-45
3-22	Water Table and Direction of Ground Water Movement for Site 4.	3-46
3-23	Variation in Vertical Hydraulic Head in the Glacial Till at Site 4 and Generalized Direction of Ground-Water Movement.	3-47
3-24	Surface Drainage at Site 8.	3-52
3-25	Geologic Cross-Sections at Site 8.	3-55
3-26	Water Table and Direction of Ground-Water Movement for Site 8.	3-58
3-27	Variation in Vertical Hydraulic Head in the Glacial Till at Site 8 and Generalized Direction of Ground-Water Movement.	3-59
3-28	Aerial Photograph of Sites 3, 4, and 8, April 1988.	3-60
3-29	Aerial Photograph of Sites 3, 4, and 8, August 1952.	3-61
3-30	Aerial Photograph of Sites 3, 4, and 8, October 1965.	3-62
3-31	Aerial Photograph of Sites 3, 4, and 8, May 1979.	3-63
3-32	Bedrock Contour Map of Sites 3, 4, and 8.	3-66
3-33	Geologic Cross-Section for Sites 3, 4 and 8.	3-69
3-34	Water Table and Direction of Ground-Water Movement for Sites 3, 4 and 8.	3-70
3-35	Variation in Vertical Hydraulic Head in the Glacial Till at Sites 3, 4 and 8, and Generalized Direction of Ground-Water Movement.	3-71
3-36	Aerial Photograph of Site 10, August 1952.	3-74
3-37	Aerial Photograph of Site 10, October 1965.	3-75

LIST OF FIGURES (continued)

		Page
3-38	Aerial Photograph of Site 10, May 15,19.	3-76
3-39	Aerial Photograph of Site 10, April 1988 Showing Surface Drainage.	3-77
3-40	Water Table and Direction of Ground Water Movement for Site 10.	3-80
4-1	Estimated Areal Extent of Trichloroethene Contamination in Ground Water at Site 2.	4-25
4-2	Estimated Areal Extent of Trans-1,2-Dichloroethene Contamination in Ground Water at Site 2.	4-26
4-3	Distribution of Near Surface Soil Pesticide and PCB Occurrences at Site 3.	4-39
4-4	Estimated Areal Extent of Trichloroethene Contamination in Ground Water at Site 3.	4-48
4-5	Estimated Areal Extent of Tetrachloroethene Contamination in Ground Water at Site 3.	4-49
4-6	Estimated Areal Extent of 1,1,1 Trichloroethane Contamination in Ground Water at Site 3.	4-50
4-7	Vertical Distribution of Trichloroethene Contamination in Ground Water at Site 3	4-52
4-8	Vertical Distribution of Tetrachloroethene Contamination in Ground Water at Site 3.	4-53
4-9	Vertical Distribution of 1,1,1 Trichloroethane Contamination in Ground Water at Site 3.	4-54
4-10	Location of Pesticide and PCB Occurrences in Surface Soils at Site 8.	4-65

LIST OF TABLES

		Page
1-1	Climatic Data for Duluth International Airport	1-14
1-2	Well Data, 1-Mile Radius of Site, Duluth IAP, Duluth, Minnesota	1-21
1-3	Phase I Priority Ranking of Potential Contamination Sources ⁽¹⁾	1-28
1-4	Parameters Analyzed and Detected in Site 2 Ground Water Samples During the Phase II, Stage 1 Investigation	1-36
1-5	Parameters Analyzed in Site 2 Soil Samples During the Phase II, Stage 2 Investigation	1-39
1-6	Parameters Detected in Site 2 Soil Samples During the Phase II, Stage 2 Investigation	1-40
1-7	Parameters Analyzed in Site 2 Water Samples During the Phase II, Stage 2 Study	1-41
1-8	Parameters Detected in Site 2 Water Samples During the Phase II, Stage 2 Investigation	1-42
1-9	Parameters Detected in Site 3 Soil Samples During the Phase II, Stage 1 Investigation	1-44
1-10	Parameters Analyzed in Site 3 Soil and Sediment Samples During the Phase II, Stage 2 Investigation	1-48
1-11	Parameters Detected in Site 3 Soil Samples During the Phase II, Stage 2 Investigation	1-49
1-12	Parameters Detected in Site 3 Sediment Samples During the Phase II, Stage 2 Investigation	1-50
1-13	Parameters Analyzed in Site 3 Water Samples During the Phase II, Stage 2 Investigation	1-51
1-14	Parameters Detected in Site 3 Water Samples During the Phase II, Stage 2 Investigation	1-52
1-15	Parameters Analyzed and Detected in Site 4 Water Samples During the Phase II, Stage 1 Investigation	1-58
1-16	Parameters Analyzed in Site 4 Soil Samples During the Phase II, Stage 2 Investigation	1-59
1-17	Parameters Detected in Site 4 Soil Samples During the Phase II, Stage 2 Investigation	1-60
1-18	Parameters Detected in Site 4 Water Samples During the Phase II, Stage 2 Investigation	1-61

		Page
1-19	Parameters Analyzed in Site 8 Soil and Water Samples During the Phase II, Stage 2 Investigation	1-66
1-20	Parameters Detected in Site 8 Soil Samples During the Phase II, Stage 2 Investigation	1-67
1-21	Parameters Detected in Site 8 Water Samples During the Phase II, Stage 2 Investigation	1-71
1-22	Parameters Analyzed and Detected in Site 10 Ground-Water Samples During the Phase II, Stage 2 Investigation	1-74
2-1	Summary of Remedial Investigation Work by Site	2-6
2-2	Drilling and Sampling Summary	2-7
2-3	Summary of Work Performed at Area Locations	2-8
2-4	Chemical Analyses Performed on Background and Airport Area Surface Water Samples	2-10
2-5	Chemical Analyses Performed on Background and Airport Area Sediment Samples	2-11
2-6	Chemical Analyses Performed on Area Background Soil Samples	2-13
2-7	Summary of Water Level Measurement Rounds at Area Backgroun Monitoring Wells	nd 2-14
2-8	Chemical Analysis Performed on Area Background Ground-Water Samples	2-18
2-9	Summary of Vork Performed at Site 2 Locations	2-19
2-10	Chemical Analyses Performed on Site 2 Surface Water Samples	2-21
2-11	Chemical Analyses Performed on Site 2 Sediment Samples	2-22
2-12	Chemical Analyses Performed on Site 2 Soil Samples	2-24
2-13	Summary of Site 2 Water Level Measurement Rounds	2-29
2-14	Chemical Analyses Performed on Site 2 Ground-Water Samples	2-30
2-15	Summary of Work Performed at Site 3 Locations	2-32
2-16	Chemical Analyses Performed on Site 3 Surface Water Samples	2-34
2-17	Chemical Analyses Performed on Site 3 Sediment Samples	2-35

Gradultschill

		rage
2-18	Targeted Compounds for Soil Gas Analysis at Site 3	2-37
2-19	Chemical Analyses Performed on Site 3 Soil Samples	2-39
2-20	Summary of Site 3 Water Level Measurement Rounds	2-40
2-21	Chemical Analysis Performed on Site 3 Ground-Water Samples	2-45
2-22	Summary of Work Performed at Site 4 Locations	2-46
2-23	Chemical Analyses Performed on Site 4 Surface Water Samples	2-48
2-24	Chemical Analyses Performed on Site 4 Sediment Samples	2-49
2-25	Chemical Analyses Performed on Site 4 Soil Samples	2-51
2-26	Summary of Site 4 Water Level Measurement Rounds	2-52
2-27	Chemical Analyses Performed on Site 4 Ground-Water Samples	2-57
2-28	Summary of Work Performed at Site 8 Locations	2-58
2-29	Chemical Analyses Performed on Site 8 Surface Water Samples	2-61
2-30	Chemical Analyses Performed on Site 8 Sediment Samples	2-62
2-31	Chemical Analyses Performed on Site 8 Soil Samples	2-64
2-32	Summary of Site 8 Water Level Measurement Rounds	2-65
2-33	Chemical Analyses Performed on Site 8 Ground-Water Samples	2-67
2-34	Summary of Work Performed at Site 10 Locations	2-68
2-35	Summary of Site 10 Water Level Measurement Rounds	2-70
2-36	Chemical Analyses Performed on Site 10 Ground-Water Samples	2-71
3-1	Streamflow at Three Airport Area Locations	3-6
3-2	Hydraulic Parameters for Site 2	3-28
3-3	Summary of Site 3 Slug Test Results	3-40
3-4	Summary of Site 4 Slug Test Results	3-49
3-5	Summary of Site 8 Slug Test Results	3-64
4-1	Metals Detected in the Background Sediment Sample	4-5
4-2	Metals Detected in Background Soil Samples	4-6

		Page
4-3	Metals Detected in Background Ground-Water Samples	4-7
4-4	Radiological Parameters Detected in Background Ground-Water and Surface Water Samples	4-9
4-5	Temperature, pH and Specific Conductance Measurements for Background Location Water Samples	4-10
4-6	Metals Detected in Sediment at Airport Area Locations	4-12
4-7	Temperature, pH and Specific Conductance Measurements for Airport Area Surface Water Samples	4-13
4-8	Metals Detected in Site 2 Sediment Samples	4-15
4-9	Temperature, pH and Specific Conductance Measurements for Site 2 Water Samples	4-16
4-10	Volatile Organic Compounds Detected in Site 2 Soil Samples From Soil Sampling Boreholes	4-18
4-11	Semi-Volatile Organic Compounds Detected in Site 2 Soil Samples	4-19
4-12	Petroleum Hydrocarbons Detected in Site 2 Soil Samples	4-20
4-13	Metals Detected in Site 2 Soil Samples	4-22
4-14	Volatile Organic Compounds Detected in Site 2 Ground-Water Samples	4-27
4-15	Temperature, pH and Specific Conductance Measurements For Site 2 Water Samples	4-28
4-16	Volatile and Semi-Volatile Organic Compounds Detected in Site 3 Surface Water and Sediment Samples	4-31
4-17	Petroleum Hydrocarbons Detected in Site 3 Sediment and Soil Samples	4-32
4-18	Metals Detected in Site 3 Sediment Samples	4-33
4-19	Summary of Temperature, pH and Specific Conductance Measurements For Site 3 Water Samples	4-34
4-20	Volatile Organic Compounds Detected in Site 3 Soil Samples	4-36
4-21	Organochlorine Pesticides and PCBs Detected in Site 3 Soil and Ground-Water Samples	4-40

		Page
4-22	Metals Detected in Site 3 Soil Samples	4-41
4-23	Volatile Organic Compounds Detected in Site 3 Ground-Water Samples	4-45
4-24	Volatile Organic Compounds Detected in Site 4 Surface Water and Sediment Samples	4-55
4-25	Petroleum Hydrocarbons Detected in Site 4 Soil Samples	4-57
4-26	Metals Detected in Site 4 Sediment Samples	4-58
4-27	Temperature, pH and Specific Conductance Measurements For Site 4 Water Samples	4-59
4-28	Metals Detected in Site 4 Soil Samples	4-61
4-29	Metals Detected in Site 4 Ground-Water Samples	4-63
4-30	Metals Detected in Site 8 Sediments Samples	4-66
4-31	Temperature, pH and Specific Conductance Measurements For Site 8 Water Samples	4-67
4-32	Organochlorine Pesticides and PCBs Detected in Site 8 Soil Samples	4-68
4-33	Metals Detected in Site 8 Soil Samples	4-70
4-34	Metals Detected in Site 8 Ground-Water Samples	4-71
4-35	Summary of Radiological Results For Ground-Water Samples Taken at Site 10	4-73
4-36	Temperature, pH and Specific Conductance Measurements For Site 10 Water Samples	4-74
5-1	Summary of Chemical and Physical Properties For Organic Compounds Detected at Duluth ANGB(1)	5-4
6-1	Severity Ratings for Noncarcinogens	6-7
6-2	Weight-of-Evidence Categories For Potential Carcinogens	6-8
6-3	Indicator Chemicals and Relevant Physical Properties - Sites 2, 3, 4 and 8	6-10
6-4	Matrix of Potential Exposure Pathways	6-12

		Page
6-5	Applicable, Relevant and Appropriate Requirements and Other Criteria For Indicator Chemicals at Sites 2, 3, 4 and 8	6-19
6-6	Sites 2, 3, 4 and 8 Critical Toxicity Values	6-33
6-7	Site 2 Indicator Chemical Concentrations	6-37
6-8	Pathways Contributing to Total Exposure For Each Potential Receptor at Site 2	6-39
6-9	Comparison of Exposure Point Concentrations of Site 2 Indicator Chemicals in Air	6-43
6-10	Summary of Hazard Index Values For Site 2 - Upper Bound	6-46
6-11	Summary of Hazard Index Values For Site 2 - Best Estimate	6-47
6-12	Summary of Risk From Potential Carcinogens For Site 2 - Upper Bound	6-48
6-13	Summary of Risk From Potential Carcinogens For Site 2 - Best Estimate	6-49
6-14	Site 3 Indicator Chemical Concentrations	6-51
6-15	Pathways Contributing to Total Exposure For Each Potential Receptor at Site 3	6-53
6-16	Comparison of Ambient Exposure Point Concentrations With Air Criteria - Site 3	6-57
6-17	Summary of Hazard Index Values for Site 3 - Upper Bound	6-60
6-18	Summary of Hazard Index Values for Site 3 - Best Estimate	6-61
6-19	Summary of Risk From Potential Carcinogens for Site 3 - Upper Bound	6-63
6-20	Summary of Risk From Potential Carcinogens for Site 3 - Best Estimate	6-64
6-21	Site 4 Indicator Chemical Concentrations	6-65
6-22	Pathways Contributing to Total Exposure for Each Potential Receptor at Site 4	6-67
6-23	Comparison of Ambient Exposure Point Concentrations With Air Criteria - Site 4	6-70
6-24	Summary of Hazard Index Values For Site 4 - Upper Bound	6-74

		Page
6-25	Summary of Hazard Index Values for Site 4 - Best Estimate	6-75
6-26	Summary of Risk From Potential Carcinogens For Site 4 - Upper Bound	6-76
6-27	Summary of Risk From Potential Carcinogens For Site 4 - Best Estimate	6-77
6-28	Site 8 Indicator Chemical Concentrations	6-78
6-29	Pathways Contributing to Total Exposure For Each Potential Receptor at Site 8	6-80
6-30	Summary of Hazard Index Values For Site 8	6-85
6-31	Summary of Risk From Potential Carcinogens For Site 8	6-87
6-32	Summary of Hazard Index Values for Sites 2, 3, 4 and 8	6-88
6-33	Summary of Risk From Potential Carcinogens For Sites 2, 3, 4 and 8	6-89
6-34	Commonplace Risks	6-91
7-1	Summary of Surface Water Contaminants by Site	7-3
7-2	Summary of Sediment Contaminants by Site	7-6
7-3	Summary of Soil Contaminants by Site	7-7
7-4	Summary of Ground-Water Contaminants by Site	7-8
7-5	Summary of Findings by Site	7-16

This page intentionally left blank.

APPENDIX M CONTINUED

epithonionises

This page intentionally left blank.

APPENDIX M TABLE OF CONTENTS

	Page
M.1 INTRODUCTION	M-7
M.2 DATA PACKAGES	M-11
Data Package #1	13
Data Package #2	75
Data Package #3	119
Data Package #4	207
Data Package #5	251
Data Package #6	331
Data Package #7	377
Data Package #8	489
Data Package #9	533
Data Package #10	607
Data Fackage #11	675
Data Package #12	781
VOLUM	ME 4
Data Package #13	857
Data Package #14	917
Data Package #15	987
Data Package #16	1055
Data Package #17	1093
Data Package #18	1131
Data Package #19	1217
Data Package #20	1283
Data Package #21	1349
Data Package #22	1419
Data Package #23	1495
Data Package #24	1569
Data Package #25	1635
VOLUM	
Data Package #26	1679
Data Package #27	1749
Data Package #28	1773

APPENDIX M TABLE OF CONTENTS(continued)

	Page
Data Package #29	1815
Data Package #30	1867
Data Package #31	1925
Data Package #32	1997
Data Package #33	2041
Data Package #34	2071
Data Package #35	2101
Data Package #36	2117
Data Package #37	2139
Data Package #38	2159
Data Package #39	2181
Data Package #40	2325
Data Package #41	2435
VOLUME 6	
Data Package #42	2493
Data Package #43	2537
Data Package #44	2549
Data Package #45	2569
Data Package #46	2603
Data Package #47	2655
Data Package #48	2701
Data Package #49	2719
Data Package #50	2739
Data Package #51	2749
Data Package #52	2785
Data Package #53	2851
Data Package #54	2863
Data Package #55	2907
Data Package #56	2953
Data Package #57	2991
Data Package #58	3009
Data Package #59	3061

APPENDIX M TABLE OF CONTENTS(continued)

	Pag
Data Package #60	309
Data Package #61	314
Data Package #62	318
Data Package #63	319
Data Package #66	319:
Data Package #67	3233
Data Package #68	323′

This page intentionally left blank.

DATA PACKAGE #26

This page intentionally left blank.

Job No.:

OR001.02

Client:

ES Oak Ridge

Attention:

Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

37830

Project:

Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 9-24-88.

Sample Preparation Data

West Francis	Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date*
	88092672	DANGB-BG-SL5-SD-1	AS-F	9-23-88		10-16-88	
	88092672	DANGB-BG-SL5-SD-1	BA-I	9-23-88		10-17-88	
886	88092672	DANGB-BG-SL5-SD-1	CD-F	9-23-88		10-17-88	
	88092672	DANGB-BG-SL5-SD-1	CR-F	9-23-88		10-18-88	
	88092672	DANGB-BG-SL5-SD-1	HG-C	9-23-88		9-17-88	
· ·	88092672	DANGB-BG-SL5-SD-1	PB-F	9-23-88		10-16-88	
Miles and Miles	88092672	DANGB-BG-SL5-SD-1	418.1	9-23-88	10-13-88	10-22-88	
ļ	88092672	DANGB-BG-SL5-SD-1	MOIS	9-23-88		10-26 - 88	
	88092672	DANGB-BG-SL5-SD-1	8010	9-23-88		10-04-88	10-03-88
ilanasia.	88092672	DANGB-BG-SL5-SD-1	8020	9-23-88		10-04-88	10-03-88
8	88092672	DANGB-BG-SL5-SD-1	8080	9-23-88	10-04-88	10-25-88	
•	88092672	DANGB-BG-SL5-SD-1	8270	9-23-88	10-04-88	11-10-88	

* If applicable





Job No.:

OR001.02

Project:

Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
38092673	DANGB-BG-SL4-SD-1	AS-F	9-23-88	 	10-16-88	
38092673	DANGB-BG-SL4-SD-1	BA-I	9-23-88		10-17-88	
38092673	DANGB-BG-SL4-SD-1	CD-F	9-23-88		10-20-88	
38092673	DANGB-BG-SL4-SD-1	CR-F	9-23-88		10-18-88	
38092673	DANGB-BG-SL4-SD-1	HG-C	9-23-88		9-17-88	
3 8092673	DANGB-BG-SL4-SD-1	PB-F	9-23-88		10-25-88	
38092673	DANGB-BG-SL4-SD-1	418.1	9-23-88	10-13-88	10-22-88	
38092673	DANGB-BG-SL4-SD-1	MOIS	9-23-88		10-26-88	
38092673	DANGB-BG-SL4-SD-1	8010	9-23-88		10-04-88	10-03-88
38092673	DANGB-BG-SL4-SD-1	8020	9-23-88		10-04-88	10-03-88
38092673	DANGB-BG-SL4-SD-1	8080	9-23-88	10-04-88	10-26-88-	
3 8092<u>6</u>73	DANGB-BG-SL4-SD-1	8270	9-23-88	10-04-88	11-10-88	
38092674	DANGB-BG-SL25-SD-1	AS-F	9-23-88		10-16-88	
38092674	DANGB-BG-SL25-SD-1	BA-I	9-23-88		10-17-88	
38092674	DANGB-BG-SL25-SD-1	CD-F	9-23-88		10-17-88	
38092674	DANGB-BG-SL25-SD-1	CR-F	9-23-88		10-18-88	
38092674	DANGB-BG-SL25-SD-1	HG-C	9-23-88		9-17-88	
38092674	DANGB-BG-SL25-SD-1	PB-F	9-23-88		10-25-88-	
38092674	DANGB-BG-SL25-SD-1	418.1	9-23-88	10-13-88	10-22-88	
38092674	DANGB-BG-SL25-SD-1	MOIS	9-23-88		10-13-88-	
38092674	DANGB-BG-SL25-SD-1	8010	9-23-88		10-04-88	10-03-88
38092674	DANGB-BG-SL25-SD-1	8020	9-23-88		10-04-88	10-03-88
38092674	DANGB-BG-SL25-SD-1	8080	9-23-88	10-04-88	10-25-88	
38092674	DANGB-BG-SL25-SD-1	8270	9-23-88	10-04-88	11-11-88-	

' If applicable

600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

Job No.:

OR001.02

Project:

Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092675	DANGB-4-SL11-SD-1	BA-I	9-23-88		10-17-88	
88092675	DANGB-4-SL11-SD-1	CD-F	9-23-88		10-17-88	
88092675	DANGB-4-SL11-SD-1	CR-F	9-23-88		10-18-88	
88092675	DANGB-4-SL11-SD-1	PB-F	9-23-88		10-16-88	
8809 2 6 7 5°	DANGB-4-SL11-SD-1	418.1	9-23-88	10-13-88	10-22-88	
88092675	DANGB-4-SL11-SD-1	MOIS	9-23-88		10-13-88	
88092675	DANGB-4-SL11-SD-1	8010	9-23-88		10-04-88	10-06-88
88092675	DANGB-4-SL11-SD-1	8020	9-23-88		10-04-88	10-06-88
88092676	DANGB-4-SL12-SD-1	BA-I	9 - 23-88	the second secon	10-17-88	
88092676	DANGB-4-SL12-SD-1	CD-F	9-23-88		10-27-88-	
88092676	DANGB-4-SL12-SD-1	CR-F	9-23-88		10-18-88	
88092676	DANGB-4-SL12-SD-1	PB-F	9-23-88		10-16-88	
88092676	DANGB-4-SL12-SD-1	418.1	9-23-88	10-13-88	10-22-88	
88092676	DANGB-4-SL12-SD-1	MOIS	9-23-88		10-13-88	1
88092676	DANGB-4-SL12-SD-1	8010	9-23-88		10-06-88~	10-04-88
88092676	DANGB-4-SL12-SD-1	8020	9-23-88		10-04-88	10-06-88

* If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88092672-88092676
WORK ORDER NO.: 1036

These soil samples were received at the ES Berkeley Laboratory on 9-24-88. They were received cold and intact.

PAGE 1

ANALYSIS REPORT

WORK ORDER NUMBER: 1036

JOB NUMBER : ZB0000000440

WORK ORDER DATE : 09/24/88

Lab Supervisor

REPORT DATA:

710 S. ILLINOIS AVE. STE. S103

_OAK RIDGE, TN 37830

JILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PD # : OROD1
CONTACT : BILL HAYDEN

(615)-481-3920

TASK: 2, UNITS: MG/KG

TEST COMPOUND	DANGB-BG-SL5- SD-1 88092672	DANGB-BG-SL4- SD-1 88092673	DANGB-BG-SL25- SD-1 88092674	DANGB-4-SL11- SD-1 88092675	DANGB-4-SL12- SD-1 88092676
3 ACID DIG SOIL	NA	NA	NA	NA	NA
ARSENIC BARIUM	<1.2	<1.2	1.7 B		
BARIUM	41.1	33.2	29.2	57.8	42.1
CADMIUM	<0.62	<0.59	<0.59	<0.61	1.3
g"CHROMIUM	14.2 N	16.3 N	15.1 N	16.9 N	8.7 N
4ERCURY	<0.12	<0.12	<0.12		
³ LEAD	4.0	4.8	7.9 s	6.1	13.8

ND - Not Detected

ANALYSIS REPORT

ORK ORDER NUMBER: 1036

38 NUMBER : ZB0000000440

ORK ORDER DATE : 09/24/88

APPROVED BY

SPORT DATA:

S OAK RIDGE/DULUTH ANGB 10 S. ILLINOIS AVE. STE. \$103

AK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 3, UNITS: mg/Kg

	DANGB-BG-SL5-	DANGB-BG-SL4-	DANGB-BG-SL25-	DANGB-4-SL11-	DANGB-4-SL12-
	SD-1	SD-1	SD-1	SD-1	SD-1
EST COMPOUND	88092672	88092673	88092674	88092675	88092676
18.1 PETROLEUM HYDROCARBONS	<100	<100	<100	210	1600
MOISTURE	24.3	23.5	15.4	21.4	13.0

ENGINEERING-SCIENCE INC. 02/06/89

ANALYSIS REPORT

ORK ORDER NUMBER: 1036

WORK ORDER DATE : 09/24/88

APPROVED BY Lab Supervisor

ELEPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

AK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

f OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

: BILL HAYDEN

CONTACT

(615)-481-3920

TASK: 4, UNITS: Ug/Kg, GROUP 8010

TEST COMPOUND	DANGB-BG-SL5- SD-1 88092672	DANGB-BG-SL4- SD-1 88092673	DANGB-BG-SL2>* SD-1 88092674	DANGB-4-SL11- SD-1 88092675	DANGB-4-SL12- SD-1 88092676
BENZYL CHLORIDE	ND	ND	ND	ND	ND
31S (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND
IS (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND
BROMOBENZENE	ND	ND	ND	ND	ND
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND
3ROMOFORM	ND	ND	ND	ND	ND
₹ 3ROMOETHANE	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND
HLORAL	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND
CHLOROETHANE	ND	ND	ND	ND	ND
:HLOROFORM	ND	1.5	ND	ND	0.54
4 1-CHLOROHEXANE	ND	ND	ND	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND
HLOROMETHANE	ND	ND	ND	ND	ND
ECHLOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND
CHLOROTOLUENE	ND	ND	ND	ND	ND
301BROMOCHLOROMETHANE	ND	ND	ND	ND	ND
TIBROMOCHLOROMETHANE STATE OF THE PROPERTY OF	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
=-1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
501CHLOROD1FLUOROMETHANE	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND
[1,2-DICHLOROETHANE	ND	ND	ND	ND	ND
1,2-D1CHLOROETHANE	ND	ND	ND	ND	ND
TRANS-1.2-DICHLOROETHYLENE	ND	ND	ND	ND	ND
1)1CHLOROMETHANE	62B	42B	53B	60B	27B
1,2-D1CHLOROPROPANE	ND	ND	ND	ND	ND

ANALYSIS REPORT FOR WORK ORDER NUMBER 1036

EST COMPOUND	DANGB-BG-SL5- SD-1 88092672	DANGB-BG-SL4- SD-1 88092673	DANGB-BG-SL25- SD-1 88092674	DANGB-4-SL11- SD-1 88092675	DANGB-4-SL12- SD-1 88092676
,3-DICHLOROPROPYLENE	KD	ND	ND	ND	ND
,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
.1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
ETRACHLOROETHYLENE	ND	ND	ND	ND	ND
,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND
,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND
₹ICHLOROETHYLENE	ND	ND	ND	ND	ND
RICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND
RICHLOROPROPANE	ND	ND	ND	ND	ND
INYL CHLORIDE	ND	ND	ND	ND	ND

- Not Detected

ANALYSIS REPORT

ORK ORDER NUMBER: 1036
OB NUMBER : 280000000440

WORK ORDER DATE : 09/24/88

APPROVED BY

ble funde

492 1 1 C

EPORT DATA:

710 S. ILLINOIS AVE. STE. S103

PAK RIDGE, TN 37830 ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TH 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1
CONTACT : BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: Ug/Kg, GROUP 8020

appropries EST COMPOUND	DANGB-BG-SL5- SD-1 88092672	DANGB-BG-SL4- SD-1 88092673	DANGB-BG-SL25- SD-1 88092674	DANGB-4-SL11- SD-1 88092675	DANGB-4-SL12- SD-1 88092676
3 CENZENE	ND	ND	ND	240	ND
HLOROBENZENE	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND	ND
THYL BENZENE	ND	ND	ND	550	760
TOLUENE	ND	ND	ND	970	360
XYLENES	ND	ND	ND	3400	3000

ND - Not Detected

ANALYSIS REPORT

ORK ORDER NUMBER: 1036

38 NUMBER : ZB0000000440

ORK ORDER DATE : 09/24/88

APPROVED BY

Lab Superviso

EPORT DATA:

3 OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

4K RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: Ug/Kg, GROUP 8080

EST COMPOUND	DANGB-BG-SL5- SD-1 88092672	DANGB-BG-SL25- SD-1 88092674
.DRIN	ND	ND
_PHA-BHC	ND	ND
ETA-BHC	ND	ND
ELTA-BHC	ND	ND
AMMA-BHC	ND	ND
ILORDANE	ND	ND
,41-DDD	ND	ND
,4'-DDE	ND	ND
,41-DDT	ND	ND
(ELDRIN	ND	ND
IDOSULFAN I	ND	ND
(DOSULFAN II	ND	ND
IDOSULFAN SULFATE	ND	ND
NDRIN	ND	ND
IDRIN ALDEHYDE	NA	NA
EPTACHLOR	ND	ND
IPTACHLOR EPOXIDE	ND	ND
EPONE	NA	NA
ETHOXYCHLOR	ND	ND
COMPRESSION	ND	ND
CB-1016	ND	ND
:B-1221	ND	ND
3B-1232	ND	ND
CB-1242	ND	ND
CB-1248	ND	ND
38-1254	ND	ND
CB-1260	ND	ND

ANALYSIS REPORT FOR WORK ORDER NUMBER 1036

TASK: 4, UNITS: ug/L, GROUP 8080

/EST COMPOUND	DANGB-BG-SL4- SD-1 88092673
- ALDRIN	ND
ALPHA-BHC	ND
s ALDRIN NLPHA-BHC BETA-BHC	ND
DELTA-BHC	ND
S "SAMMA-BHC	ND
를 :HLORDANE	ND
TAMMA-BHC HLORDANE 4,4'-DDD	ND
4,41-DDE	ND
,,4'-DDT):ELDRIN	ND
DIELDRIN	ND
ENDOSULFAN I	ND
ENDOSULFAN 11 ENDOSULFAN SULFATE	ND
NDOSULFAN SULFATE	ND
E .:NDRIN	ND
ENDRIN ALDEHYDE	NA
TEPTACHLOR EPOXIDE KEPONE	ND
EPTACHLOR EPOXIDE	ND
³ KEPONE	NA
METHOXYCHLOR	ND
OXAPHENE CB-1016	ND
CB-1016	ND
PCB-1221	ND
PCB-1232	ND
°CB-1242	ND
°CB-1248	ND
PCB-1254	ND
PCB-1260	ND
· ·	

ND - Not Detected

ENGÎNEERÎNG SCIÊNCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Jate Received: September 24, 1988 Jate Reported: December 9, 1988

Work Order: 1036 Job Number: OR001

ATTN: Mr. Bill Hayden

ES:Oak Ridge/Duluth ANGB 710 S. Illinois AVE, Suite F-103 Oak Ridge, TN 37830 Address:

Sab Number:	88092672	88092673
Sample No.:	DANGB-BG-SL5-	DANGB-BG-SL4-
	SD-1	SD-1
Date Sampled:	9-23-88	9-23-88
Timé Samplêd:	09:00	09:45
Date Extracted:	10-04-88	10-04-88
Jate Analyzed:	11-10-88	11-10-88
Percént Moisture:	24	24

Compound	Detection Limits		L RESULTS Peight)
	ug/kg	ug/kg	ug/kg
1,3-Dichlorobenzene	330	ND	ND
1,4-Dichlorobenzene	330	ND	ND
Hexachloroethane	330	ND	ND
Bis(2-chloroethyl)ether	330	ND	ND
1,2-Dichlorobenzene	330	ND	ND
N-Nitrosodimethylamine	330	ND	ND
Bis(2-chloroisopropyl)ethe	r 330	ND	ND
N-Nitrosodi-n-propylamine	330	ND	ND
Hexachlorobutadiène	330	ND	ND
1,2,4-Trichlorobenzene	330	ND	ND
Nitrobenzene	330	ND	ND
Isophorone	330	ND	ND
Naphthalene	330	ND	ND
Bis(2-chloroethoxy)methane	330	ND	ND
2-Chloronaphthalene	330	ND	ND
Hexachlorocyclopentadiene	330	ND	ND
Acenaphthylene	330	ND	ND
Acenaphthene	330	ND	ND
Dimethyl phthalate	330	ND	ND
2,6-Dinitrotoluéne	330	ND	ND
Fluorene	330	ND	ND
2,4-Dinitrotoluene	330	ND	ND
Diethyl phthalate	330	ND	ND
N-Nitrosodiphenylamine	330	ND	ND
Hexachlorobenzené	330	ND	ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: September 24, 1988 Work Order: 1036
Date Reported: December 9, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092672	88092673
Sample No.:	DANGB-BG-SL5-	DANGB-BG-SL4-
	SD-1	SD-1
Date Sampled:	9-23-88	9-23-88
Time Sampled:	09:00	09:45
Date Extracted:	10-04-88	10-04-88
Date Analyzed:	11-10-88	11-10-88
Percent Moisture:	24	24

	Compound D	etection Limits		AL RESULTS veight)
* 1		ug/kg	ug/kg	ug/kg
Colegical	Phenanthrene	330	ND	ND
	Anthracene	330	ND	ND
š	Dibutyl phthalate	330	ND	ND
A.P. Bush	Fluoranthene	330	ND	ND
â	4-Chlorophenyl phenyl ether	330	ND	ND
,	Pyrene	330	ND	ND
100	Butyl Benzyl phthalate	330	ND	ND
4	Bis(2-ethylhexyl) phthalate	330	ND	ND
	Chrysene	330	ND	ND
Í	4-Bromophenyl phenyl ether	330	ND	ND
Recipies	Benzo(a)anthracene	330	ND	ND
	Di-n-octylphthalate	330	ND	ND
ž	Benzo(b)fluoranthene	330	ND	ND
****	Benzo(k)fluoranthene	330	ND	ND
ž	Benzidine	2000	ND	ND
-	3,3'-Dichlorobenzidine	660	ND	ND
Section Section	Benzo(a)pyrene	330	ND	ND
4900	<pre>lndeno(1,2,3-cd)pyrene</pre>	330	ND	ND
	Dibenzo(a,h)anthracene	330	ND	ND
- Front	Benzo(ghi)perylene	330	ND	ND
Post in the	Benzyl Alcohol	660	ND	ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: September 24, 1988 Date Reported: December 9, 1988 Work Order: 1036
Job Number: OR001

For: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

<pre>Lab Number: Sample No.:</pre>	88092672 DANGB-BG-SL5- SD-1	88092673 DANGB-BG-SL4- SD-1
Date Sampled:	9-23-88	9-23-88
Time Sampled:	09:00	09:45
Date Extracted:	10-04-88	10-04-88
Date Analyzed:	11-10-88	11-10-88
Percent Moisture:	24	24

Jompound	Detection Limits	-	al Results weight)
	"ug/kg	ug/kg	ug/kg
Acetophenone	*	ND	ND
Aniline	*	ND	ND
4-Aminobiphenyl	*	ND	ND
4-Chloroaniline	660	ND	ND
1-Chloronaphthalene	*	ND	ND
Dibenzofuran	330	ND	ND
p-Dimetnylaminoazobenzene	e*	ND	ND
7,12-Dimethylbenz(a)anth:	racene*	ND	ND
a-,a-Dimethylphenethylam	ine*	ND	ND
Diphenylamine	*	ND	ND
1,2-Diphenylhydrazine	*	ND	ND
Ethyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	*	ND	ND
Methyl methanesulfonate	*	ND	ND
2-Methylnaphthalene	330	ND	ND
1-Naphthylamine	*	ND	ND
2-Naphthylamine	*	ND	ND
2-Nitroaniline	1600	ND	ND
3-Nitroaniline	1600	ND	ND
4-Nitroaniline	1600	ND	ND
N-Nitroso-di-n-butylamin	e ~-*	ND	ND
N-Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	*	ND	ND
Pentachloronitrobenzene	*	ND	ND
Phenacetin	*	ND	ND
2-Picoline	×	ND	ND
Fronamide	×	ND	ND
1,2,4,5-Tetrachlorobenze	ne*	ND	ND

 $[\]star$ EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: September 24, 1988 Work Order: 1036
Date Reported: December 9, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

_ Lab Number:	88092672	88092673
Sample No.:	DANGB-BG-SL5-	DANGB-BG-SL4-
Eg G G G G	SD-1	SD-1
Date Sampled:	9-23-88	9-23-88
Time Sampled:	09:00	09:45
Date Extracted:	10-04-88	10-04-88
Date Analyzed:	11-10-88	11-10-88
Fercent Moisture:	24	24

	Compound	Detection Limits ug/kg		FICAL RESULTS Fy weight) ug/kg
- Adhibidhabaka		~9/ ^9		
	Alpha-BHC	 *	ND	ND
No.	Gamma-BHC	 *	ND	ND
National .	Beta-BHC	660	ND	ND
:	Heptachlor	330	ND	ND
ŧ	Delta-BHC	500	ND	ND
and the same	Aldrin	330	ND	ND
į	Heptachlor epcxide	330	ND	ND
	Endosulfan I	 *	ND	ND
-	Dieldrin	50 0	ND	ND
THE STREET	4,4'-DDE	1000	ND	ND
	Endrin	*	ND	ND
I	Endosulfan II	×	ND	ND
1	4,4'-DDD	500	ND	ND
3	4,4'-DDT	830	ND	ND
,	Endosulfan Sulfate	1000	ND	ND
NAME OF TAXABLE PARTY.	Endrin aldehyde	*	ND	ND
***	Endrin Ketone	*	ND	ND
	Chlordane	2000	ND	ND
SAN PERSON	Methoxychlor	*	ND	ND
Part Charle	Toxaphene	2000	ND	ND
	Aroclor-1016	2000	ND	ND
enso.	Aroclor-1221	2000	ND	ND
PERMITTER OF	Aroclor-1232	2000	ND	ND
*	Aroclor-1242	2000	ND	ND
e -	Aroclor-1248	2000	ND	ND
Sell profess	Aroclor-1254	2000	ND	ND
¥.	Aroclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: September 24, 1988 Work Order: 1036
Date Reported: December 9, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092672	88092673
Sample No.:	DANGB-BG-SL5-	DANGB-BG-SL4-
	SD-1	SD-1
Date Sampled:	9-23-88	9-23-88
Time Sampled:	09:00	09:45
Date Extracted:	10-04-88	10-04-88
Date Analyzed:	11-10-88	11-10-88
Percent Moisture:	24	24

Compound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
2-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
Phenol	330	ND	ND	
2,4-Dimethylphenol	330	ND	ND	
2,4-Dichlorophenol	330	ND	ND	
2,4,6-Trichlorophenol	330	ND	ND	
4-Chloro-3-methylphenol	660	ND	ND	
2,4-Dinitrophenol	1600	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
2-Methyl-4,6-Dinitrophenol	. 1600	ND	ND	
Pentachlorophenol	1600	ND	ND	
4-Nitrophenol	1600	ND	ND	
Benzoic Acid	1600	ND	ND	
2-Methylphenol	330	ND	ND	
3- & 4-Methylphenol	330	ND	ND	
2,3,4,6-Tetrachlorophenol	*	ND	ND	
2,4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

* EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received: September 24, 1988 Work Order: 1036 Date Reported: December 9, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden ES:Oak Ridge/Duluth ANGB

710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830 Address:

i

j

_ Lab Number:	88092674
Sample No.:	DANGB-BG-SL25-
l.	SD-1
Date Sampled:	9-23-88
Time Sampled:	10:15
Date Extracted:	10-04-88
Date Analyzed:	11-11-88
Percent Moisture:	15

Selection Actions	Compound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
•	1,3-Dichlorobenzene	330	ND	
3	1,4-Dichlorobenzene	330	ND	
1	Hexachloroethane	330	ND	
2 -	Bis(2-chloroethyl)ether	330	ND	
7	1,2-Dichlorobenzene	330	ND	
	N-Nitrosodimethylamine	330	ND	
1	Bis(2-chloroisopropyl)ethe	r 330	ND	
	N-Nitrosodi-n-propylamine	330	ND	
7	Hexacnlorobutadiene	330	ND	
Post Property	1,2,4-Trichlorobenzene	330	ND	
	Nitrobenzene	330	ND	
# 1 T	Isophorone	330	ND	
10 tot 201	Naphthalene	330	ND	
ž.	Bis(2-chloroethoxy)methane	330	ND	
-	2-Chloronaphthalene	330	ND	
odderaid.	Hexachlorocyclopentadiene	330	ND	
6	Acenaphthylene	330	ND	
	Acenaphthene	330	ND	
a solut	Dimethyl phthalate	330	ND	
Children of the Children of th	2,6-Dinitrotoluene	330	ND	
_	Fluorene	330	ND	
缪	2,4-Dinitrotoluene	330	ND	
	Diethyl phthalate	330	ND	
ā.	N-Nitrosodiphenylamine	330	ND	
	Hexachlorobenzene	330	ND	
煉.				

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: September 24, 1988 Work Order: 1036
Date Reported: December 9, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Jab Number:88092674Sample No.:DANGB-BG-SL25-SD-1SD-1Jate Sampled:9-23-88Time Sampled:10:15

 Time Sampled:
 10:15

 Date Extracted:
 10-04-88

 Date Analyzed:
 11-11-88

Percent Moisture:

Compound [etection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg
Phenanthrene	330	ND
Anthracene	330	ND
Dibutyl phthalate	330	ND
Fluoranthene	330	ND
4-Chlorophenyl phenyl ether	330	ND
⊋yrene	330	ND
Butyl Benzyl phthalate	330	ND
31s(2-ethylhexyl) phthalate	e 330	ND
Chrysene	330	ND
4-Bromophenyl phenyl ether	330	ND
Benzo(a)anthracene	330	ND
Di-n-octylphthalate	330	ND
∃enzo(b)fluoranthene	330	ND
Benzo(k)fluoranthene	330	ND
3enzidine	2000	ND
3,3'-Dichlorobenzidine	660	ND
Benzo(a)pyrene	330	ND
Indeno(1,2,3-cd)pyrene	330	ND
Dibenzo(a,h)anthracene	330	ND
Benzo(ghi)perylene	330	ND
Senzyl Alcohol	660	ND

(continued)

Date Received: September 24, 1988 Work Order: 1036
Date Reported: December 9, 1988 Job Number: OR001

For: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: 88092674
Sample No.: DANGB-BG-SL25SD-1
Date Sampled: 9-23-88
Time Sampled: 10:15
Date Extracted: 10-04-88
Date Analyzed: 11-11-88

Date Analyzed: 11Percent Moisture: 15

	Compound	Detection Limits ug/kg	Analytical Results (dry weight) ug/kg
	Acetophenone	×	ND
	Aniline	*	ND
	4-Aminobiphenyl	*	ND
	4-Chleroaniline	660	ND
	1-Chloronaphthalene	*	ND
	Dibenzofuran	330	ND
	p-Dimethylaminoazobenzene	 *	ND
	7,12-Dimethylbenz(a)anthr		ND
	a-,a-Dimethylphenethylami		ND
	Diphenylamine	*	ND
	1,2-Diphenylhydrazine	*	ND
	Ethyl methanesulfonate	*	ND
	3-Methylcholanthrene	*	ND
	Methyl methanesulfonate	*	ND
ı	2-Methylnaphthalene	330	ND
	1-Naphthylamine	~ - *	ND
2	2-Naphthylamine	*	ND
	2-Nitroaniline	1600	ND
Marie	3-Nitroaniline	1600	ND
	4-Nitroaniline	1600	ND
	N-Nitroso-di-n-butylamine	*	ND
9	N-Nitrosopiperidine	*	ND
860	Pentachlorobenzene	*	ND
٤.	Pentachloronitrobenzene	*	ND
	Phenacetin	~ - *	ND
SCHALL N	2-Picoline	*	ND
3	Pronamide	*	ND
	1,2,4,5-Tetrachlorobenzen	e*	ND
٠.			

EPA has not yet determined detection limits for these compounds.

ATTN:Mr. Bill Hayden

Přiority Pollutant Analysis Pěsticiděs and PCBS. - SW 8270 Matrix: Soil

Date Received:September 24, 1988Work Order: 1036Date Reported:December 9, 1988Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: 88092674
Sample No.: DANGB-BG-SL25-

erercent Moisture:

Jompound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
Alpha-BHC	*	ND	
Jamma-BHC	*	ND	
Beta-BHC	660	ND	
Heptachlor	330	ND	
Delta-BHC	500	ND	
Aldrin	330	ND	
Heptachlor epoxide	330	ND	
Endosulfan I	 *	ND	
Dieldrin	500	ND	
4,4'-DDE	1000	ND	
Endrin	*	ND	
Endosulfan II	*	ND	
4,4'-DDD	500	ND	
±,4'-DDT	830	ND	
Endosulfan Sulfate	1000	ND	
Endrin aldehyde	*	ND	
Endrin Ketone	*	ND	
Chlordane	2000	ND	
Methoxychlor	~~ ★	ND	
Toxaphene	2000	ND	
Aroclor-1016	2000	ND	
Aroclor-1221	2000	ND	
Aroclor-1232	2000	ND	
Aroclor-1242	2000	ND	
Aroclor-1248	2000	ND	
Aroclor-1254	2000	ND	
Aroclor-1260	2000	ND	

 $[\]star$ EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: September 24, 1988 Work Order: 1036
Date Reported: December 9, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.:	88092674 DANGB-BG-SL25- SD-1
Date Sampled:	9-23-88
Time Sampled: Date Extracted:	10:15
Date Extracted:	10-04-88
Date Analyzed:	11-11-88
Percent Moisture:	15

SHIPPING BURNER & SHIPPING	Compound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	ug/kg
	2-Chlorophenol	330	ND	
Alido d	2-Nitrophenol	330	ND	
Salara .	Phenol	330	ND	
	2,4-Dimethylphenol	330	ND	
1	2,4-Dichlorophenol	330	ND	
200	2,4,6-Trichlorophenol	330	ND	
1	4-Chloro-3-methylphenol	660	ND	
2	2,4-Dinitrophenol	1600	ND	
1	2,6-Dichlorophenol	*	ND	
ŧ	2-Methyl-4,6-Dinitrophenol	1600	ND	
	Pentachlorophenol	1600	ND	
Z Carpon	4-Nitrophenol	1600	ND	
	Benzoic Acid	1600	ND	
	2-Methylphenol	330	ND	
,	3- & 4-Methylphenol	330	ND	
1	2,3,4,6-Tetrachlorophenol	*	ND	
ţ	2,4,5-Trichlorophenol	330	ND	

Jama Kurk

Analyst

Laboratory Supervisor

* EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

FINGINEERING-DCIENCE

1036

CHAIN OF CUSTODY RECORD

				מוססום וורססום		
ES JOS NO.	9 40	PROJECT NAME/LOCATION	3	los	LS ANALYSES REQUIRED	SHIP TO:
סאס	15	Duluth ANGB/Duluth, Mn.	Z		1 / 2/2/	ENGINEERING-SCIENCE
SAMPLE	Egys: (Sign	SAMPLERIS): (Signature)	CON-	0208	1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1	600 Bancroft Way Berkeley, CA. 94710
DATE	TIME	SAMPLE DESCRIPTION	TAINERS	OLOPHS OLOPHS OLOPHS	OLOS OLOS	REMARKS
4.23.48	9060	DANG8-BG-SC5-5D-1				582679
1-23-88	0000	DANGB- 86-519-50-1	1	XXXX		383672
8-55-b 0045	0945	DANG 3-BG-564-5D-1	/	×		588673
9-23.88 09.45	09.45	DANGB- B6-564-5D-1	1.	××××		882673
89-52-6	619	DAN615-BC-5625-5D-1		×		をいいのまで
R3-87-b	1015	DANGB- B6-5225-5D-1	_	* * * * * *		22000
9-13-84 1045	1045	DANCE- 4-5211-50-1	/	×		10000
4-23-W	1045	DANKB- 4-5611-50-1	1	×××	Venter Age	or 1
8452-6	1100	DANGB- 4-5612-50-1		X		
9-13-8X	1100	DANCI3- 4-5612-50-1		XXX	Den to	(1,20 F. "
		0				
_1		2/1/1/2				
70		1 had been				
2						
	\					
Rellngu	shed by	Reilngulahed by: (Signature) Date/Time Receive	Received by; (Signature)	Relinquished by: (Signature)	iture) Date/Time	ime Received by: (Signature)
2	27	L How 9-25-84 1400 Fed to	Fed Ex Alvhill #			
Relinqui	ka peus	Relinquished by: (Signature) Date/Time Received (Signature)	Received for Laboratory by:	2428 4.00	12 - 1802	tuto oki y Intert
				V	·	

	101	Sample 8809267 8809278	No(s): 6, 88092731-88092741 3, 88092799-88092800	18092741 18092800
Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date . Prep
Arsenic	88092672	88092672	10-16-88	NA
Cadmium	88092672	88092672	10-17-88	NA
Chromium	88092672	88092672	10-18-88	NA
<u>1</u> 7	88092672	88092672	10-16-88	NA
03				
NOTE: If % N See	% moisture is repe Legend attached.	is reported, ached.	results are	presente
Relative	Percent Diff	Difference (RPD)	$= \frac{c_1 - c_2}{(c_1 + c_2)/2}$	x 100
Percent Re	Recovery (PR) =_	SSR - SR SA	× 100	
	89-DULU0833	pool		

AAF-S-0051-88 mg/KG 9-24-88 1-31-89 Soil Dilution Factor: Date Reported: Sample Matrix: Date Received: QC Report No: Conc. Unit: %Moisture:

710 S. Illinois Avenue

Address:

ES Oak Ridge Bill Hayden

OR001.02

Job No.:

Cl fent: Attn: 37830

Oak Ridge, In.

Suite F-103

QC Report for Laboratory Sample No(s):

Duluth ANGB

Project:

表記記

一名ないなか

A STATE OF THE PARTY OF THE PAR

SHOW SHOW

Contraction of the Contraction o

Districtions:

Seminarian properties and seminarian properties of TALL STATE STAT

METALS

Laboratory Supervisor Approval:

											r			
Analyte	Laboratory Sample Nos. Duplicates Spike	Sample Nos. Spike	Date Anal	Date . Prep	Anal Blank Method	Blank	رة ا	Duplicate Cl C2	RPD	∀υ	Spike R	Spike Recovery	ļ ģ	
									- 1	6	400	SOR	rk Notes	Notes
Arsenic	88092672	88092672	10-16-88	NA	7060	<1.0	<1.24	7060 <1.0 <1.24 <1.24	NC	9.91	9.91 <1.24 7.96	7.96	80] -
Cadmium	88092672	88092672	10-17-88	NA	7131	<0.50	<0.50 <0.62 <0.62	<0.62	NC	2.48	2.48 <0.62 2.73	2.73	O.F.	
Ch romium	88092672	88092672	10-18-88	Ϋ́Z	0109	·	·	i.	;		!)	2	*****
))	• • •	0100	7.	71.0 14.5 12.5	17.5	13	96*4	4.96 14.2	25.8	234N	
17 (88092672	88092672	10-16-88	NA	7421	<0.50 3.97		3.44	-	4.96	4.96 3.97	7.68	75	~****
03														

are presented on a dry-weight basis. See ΙĘ

NC = Not Calculated ND = Not Detected NA = Not Applicable Cl = Concentration One C2 = Concentration Two = Concentration Two x 100 - c2 c2)/2

SSR = Spiked Sample Result SR = Sample Result

SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY METALS

の意思を記録を記るという

OR001.02 Job No.:

ES Oak Ridge

Bill Hayden Address: Client:

Attn:

37830 710 S. Illinois Avenue Oak Ridge, Tn. Suite F-103

ICP-S-0047-88 9-24-88 1 - 31 - 89mg/KG Soil Dilution Factor: Sample Matrix: Date Received: Date Reported: QC Report No: Conc. Unit: ZMoisture:

> Duluth ANGB Project:

QC Report for Laboratory Sample No(s):

88092672-88092676, 88092731-88092741 88092781-88092783, 88092799-88092800

Laboratory Supervisor Approval:

Anal Date Prep Date Anal Sample Nos. . Spike Laboratory Duplicates Analyte

CBlank <20 Method 6010

Ä

10-17-88

88092672

88092672

Barium

42.3 41.1

496 3

514 41.1

95

Notes

Spike Recovery

SSR

SR

SA

RPD

 \ddot{c}

Duplicate

1704

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

Cl = Concentration One C2 = Concentration Twox 100 (C1 + C2)/2= C1 - C2 Relative Percent Difference (RPD)

NA = Not Applicable NC = Not Calculated

ND = Not Detected

Percent Recovery (PR) = $SSR - SR \times 100$

SSR = Spiked Sample Result

SA = Spike Added (Concentration)

<u>~</u>
89-DULU0831

	•					PR Notes
027-88				1:		Spike Recovery SR SSR
CVM-S-0027-88 Sol11	mg/KG 9-24-88	1-31-89 NA 10-3	19.3	Laboratory Supervisor Approval:		Spik SA SR
No:	ived:	rred: Factor:	••	y Supervis		te RPD
QC Report No:	Conc. Unit: Date Received:	Date Reported: Dilution Factor:	/Moisture:	Laborator		Duplicate C1 C2
					۷.	Blank
						Anal Method
					-88092741 -88092800	Date Prep
	٠	renue	37830	•	o(s): , 88092731 , 88092799	Date Anal
.02	ES Oak Ridge Bill Hayden	<u>ک</u> د	Oak Ridge, In.	Duluțh ANGB	QC Report for Laboratory Sample No(s): 88092672-88092676, 88092731-88092741 88092781-88092783, 88092799-88092800	Laboratory Sample Nos. Duplicates Spike
OR001.02	ES Oa Bill	710 S Sufte	Oak F	Duluţ	fọr Labora 88092 88092	Laboratory Duplicates
Job No.:	Client: Attn:	Address:		Project:	QC Report	Analyte

電影をはなるからなるできる。 こう

A SERVICE CONTRACTOR

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

110

0.680

0.620 <0.12

NC

<0.10 <0.12 <0.12

7471

NA

88092672 10-17-88

88092672

Mercury

1705

Relative Percent Difference (RPD) =
$$\frac{\text{Cl} - \text{C2}}{(\text{Cl} + \text{C2})/2}$$
 X 100 Cl = Concentration One NA = Not Applicable (Cl + C2)/2 C2 = Concentration Two NC = Not Calculated NA = Not Detected

Percent Recovery (PR) =
$$\frac{SSR - SR}{SA} \times 100$$
 SSR = Spiked Sample Result SR = Sample Result SA = Spike Added (Concentration)

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

SAMPLE NO(S):: 88092672-88092676, 88092731-88092741 SAMPLE NO(S):: 88092781-88092783, 88092799-88092800

The detection limit for the analyte(s); arsenic, cadmium, chromium, lead, barium and mercury are provided by the sub-contract laboratory and based on a dry-weight of the sample.

(Production of the second

PHONON PROPERTY

Trought palents

			•			ı				
Job No.:	08001					QC Report No:	No:	TPH-S-0063-88	3-88	
						Sample Matrix:	crix:	Soil		
Client:	ES Oak Ridge					Conc. Unit:	**	mg/KG		
Attn:	Bill Hayden					Date Received:	[ved:	9-54-88		
Address:	710 S. Illinois Avenue	Avenue				Date Prepared:	ared:	10-13-88		
	Suite F-103					Date Analyzed:	/zed:	10-22-88		
•	Oak Ridge, In.	37830				Date Reported:	rted:	11-01-88		
						Dilution Factor:	factor:	7		
						#Moisture:		24.3		
Project:	Duluth ANGB					•	٠.	•		
						Laborator	/ Supervi	Laboratory Supervisor Approval:	••	
QC Report for	<pre>QC Report for Laboratory Sample No(s): 88092672-88092676</pre>	No(s): 6					ANBS	Am	1	
	88092731-88092741	***								
Laboratory	Anal									
Sample No.	Method	Blank	SR	SA	MS	PR	MSD	PR	RPD	Notes
88092672	418.1	<100	<100	1320	1250	106	1290	86	٣	
Blank	418.1	<100	<100	1000	1100	110	1000	100	01	
176										
17										

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

•	NA = Not Applicable	NC = Not Calculated	ND = Not Detected
	MS = Spike Sample	MSD = Spike Duplicate	
	Relative Percent Difference (RPD) = MS - MSD X 100	(MS + MSD) /2	

Percent Recovery (PR) = $SSR - SR \times 100$

SR = Sample Result
SA = Spike Added (Concentration)

SOUNCE JO

88-A1-DULU0289 1

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

35-0900-S-39

10-10-88 11-03-88

Dilution Factor:

% Moisture:

Date Reported:

MA

Date Prepared:

Date Analyzed:

Date Received:

Conc. Unit:

Sample Matrix:

QC Report No:

9-27-88 ug/KG Soil

OR001 Job No.:

ES Oak Ridge Bill Hayden Cl lent:

710 S. Illinois Avenue

Address:

At tn:

Sufte F-103

37830 Oak Ridge, In. Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s).:

Duluth ANGB

Project:

88092672-88092676, 88092731-88092741 88092781-88092783, 88082255

Laboratory Sample No.	Compound	VS	SR	HS	ጸዳ	MSD	PR	RPD	ES RPD	QC Limits %Recovery
	Halocarbons: 8010									
88092739	1,1-dichloroethane	10	Ð	8.32	83	5.50	55*	414	20	58-124
	Trichloroethene	10	2 3	7.90	79	6.34	63*	22* 15	16	71-125
	Chlorobenzene	ĪΩ	QN	90.0	10	7.61	76	1.7	;	(71.17)
1	Aromatics: 8020									
7 6822688	Benzene	10	2.3	13.8	115	8.33	¥09	¥6 7	26	75-123
	Toluene	10	5.5	16.6	1111	11.3	58*	38*	16	79-115
	Chlorobenzene	10	<u>R</u>	05.6	176	8.21	82	14	24	82-112

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

See Case Narrative attached.

× 100 (MS + MSD)/2MS - MSD Relative Percent Difference (PR)

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MSD = Spike Sample Duplicate MS = Spike Sample

SR = Sample Result SA = Spike Added (Concentration)

NA = Not Applicable NC = Not Calculated ND = Not Detected NT = Not Tested

Score felal space

QUALITY CONTROL RESULTS SUMMARY

VOLATILE ORGANICS EPA 8010/8020

VGC-S-0060-88B

10-10-88 11-03-88

Date Analyzed:

Date Reported:

Date Prepared:

Date Received:

Conc. Unit:

ug/KG NA Soil

Sample Matrix:

QC Report No:

新工程的证据

THE PROPERTY

Salar Maria

fortheathast

D.Stanbeing.

CR001 Job No.: ES Oak Ridge

Bill Hayden Client: Attn:

710 S. Illinois Avenue

Address:

Sufte F-103

37830 Oak Ridge, In.

Duluth ANGB Project: QC Report for Laboratory Sample No(s).: 88092672-88092676, 88092731-88092741 88092781-88092783, 88082255

Laboratory Supervisor Approval:

Dilution Factor:

% Moisture:

Laboratory		***	a	NG	90	G OF	80	CIGG	ES	QC Limits
Sample No.	Compound	SA	or.	CLI	۲.	ממוי		7 111		, which was a state of the stat
	Halocarbons: 8010									
Z 0 7,	-dichloroethane	10	£	9.46	95	10.4	104	6	20	58-124
WI TO	Trichloroethene	10	2	9,33	93	9.61	96	က	91	75-110
	Chlorobenzene	01	QN:	8.78	88	9.11	16	4	21	71-125
1	Aromatics: 8020									
17 de 12	Rengene	2	 2	9.24	92	10.0	100	œ	26	75-123
	Toluene	10	£	9.38	1/6	9.53	95	2	16	79-115
9	Chlorobenzene	10	Q.	9.10	91	9.25	92	7	77	82-112

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

× 100 (MS + HSD)/2MS - NSD Relative Percent Difference (PR)

Percent Recovery (PR) = (MS or MSD) - SR x 100

MSD = Spike Sample Duplicate MS = Spike Sample

SA = Spike Added (Concentration) SR = Sample Result

Not Applicable Not Calculated Ħ 11 11 S S ž

88-A1-DULU0290 1

METHOD BLANK SUMMARY

Calendary of

A Runneya CV 1

0R001 Job No: Client: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Lidge, In. 37830

Conc. Unit: Date Reported: Sample Matrix:

Soil ug/Kg 11-03-88

Laboratory Supervisor Approval:

Duluth ANGB Project:

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO(S).: VGC-S-0060-88
QC REPORT NO(S).: VGC-S-0060-88B

Percent recovery and relative percent difference for some of the matrix spiking compounds are outside ES Laboratory acceptance limits. A blank spike analysis shows the laboratory to be in control.

Results for Sample No. 88092739 are reported on a wet weight basis, since percentage moisture was not performed.

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

ORO01

QC Report No.:

OCP-S-0037-88

Client:

ES Oak Ridge

QC Sample No.:

Date Reported:

88092674

Attn:

Bill Hayden

Level (Low/Med): Low

Low

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

11-03-88

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Nursens

-

QC Report for Laboratory Sample No(s).:

88092672-88092674, 88092731-88092737

37830

88092782-88092783

Compound	Amount · Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2360	ND	49.2	62	46-127
Heptachlor	2360	ND	49.8	63	35-130
Aldrin	2360	ND	ND	NC*	34-132
Dieldrin	5910	ND	144	73	31-134
Endrin	5910	ND	122	62	42-139
4,47-DDT	5910	ND	160	81	23-134

	MSD Conc.	MSD %	`1S %	7) /s	QC Limits	
	In Extract (ug/Kg)	Rec. #	Rec. #	RPD #	RPD	REC
Lindane	39,5	76	62	19	50	46-127
Heptachlor	56,7	85	63	29	31	35-130
Aldrin	40.5	63	лс*	NC*	43	34-132
Dieldrin	181	92	73	23	38	31-134
Endrin	152	77	62	22	45	42-139
4,47-DDT	145	74	91	9	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 1 out of 6 outside limits

Spike Recovery: 1 out of 12 outside limits

^{*} Values outside of QC limits

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

ORO01

QC Report No.:

OCP-S-0037-88B

Client:

ES Oak Ridge

QC Sample No.:

Bl ank

Attn:

Bill Hayden

Level (Low/Med): Low

Low

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

Date Reported: 11-03-88

Project:

Duluth ANGB

Laboratory Supervisor Approval:

- - - **J** - - -

_ AWBinstor

QC Report for Laboratory Sample No(s).:

88092672-88092674, 88092731-88092737

37830

88092782-88092783

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2000	ND	37.0	56	46-127
Heptachlor	2000	ND	42.5	64	35-130
Aldrin	2000	ND	37.5	56	34-132
Dieldrin	5000	ND	115	69	31-134
Endrin	5000	ND	88.8	53	42-139
4,47-DDT	5000	ND	99.0	60	23-134

	MSD Conc. In Extract	MSD %	MS %	%	QC Lit	nits
	(ug/Kg.	Rac. #	Rec. #	RPD #	RPD	REC
Lindane	50.7	76	56	31	50	46-127
Heptachlor	49.0	74	64	14	31	35-130
Aldrin	39.3	\$0	56	6	43	34-132
Dieldrin	130	78	69	12	38	31-134
Endrin	103	33	53	20	45	42-139
4,47-DDT	211	127	60	72*	50	23-134

 $[\]ddot{\it{i}}$ Column to be used to thag recovery and RPD values with an asterisk

RPD: 1 out of 6 outside limits

Spike Recovery: 0 out of 12 outside limits

1713

88-A1-DULU0281 1

PT-FRM05

^{*} Values outside of QC limits

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: OCP-S-0037-88
QC REPORT NO.: OCP-S-0037-88B

Matrix spike concentration is not detected for aldrin, therefore, spike recovery and relative percent difference are not calculated. A blank spike analysis shows the laboratory to be in control.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up required by these samples.

1714

PESTICIDE METHOD BLANK SUMMARY

Job No.:

OR001

Lab Name:

Engineering Science

Lab Sample No.:

Blank

Client:

ES Oak Ridge

Attn:

Bill Hayden

Address:

710 S. Illinois Avenue

37830

Suite F-103

Oak Ridge, Tn.

Matrix:

Soil Low

Level (low/med):

Extraction:

(SepF/Cont/Sonc): Sonc

Date Reported: 11-03-88

Project:

Duluth ANGB

Date Extracted:

10-04-88

Date Analyzed (1). 10-25-88

Time Analyzed (1): 06:17

Instrument ID (1): 5890 #2

GG Column ID (1): OV-1

Time Analyzed (2): 03:43

Instrument ID (2): 5880 GC Column ID (2): Mixed

Date Analyzed (2): 10-26-88

This Method Blank applies to the following samples, MS and MSD.

EPA Sample No.	Lab Sample ID (1)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2	
- - -	88092672 88092673 88092674	10-25-88 10-25-88 10-25-88	88092673 88092674	10-25-88 10-25-88	

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

College

Sychological Colors

K. Kiği Şandanılı 4.

\$ salkerobids.

+

Standidistrict

and Substitute 6

Personal vi

Enthagaine T

Sample Matrix: QC Report No: **OR001** Job No.:

BNA-S-0052-88

9-29-88 10-07-88 11-10-88 12-13-88

> Date Prepared: Date Analyzed: Date Reported:

Date Received:

Conc. Unit:

ug/KG

Soil

ES Oak Rilge Bill Hayden Address: Client: Attn:

710 S. Illinois Avenue Suite F-103

Oak Ridge, In.

Laboratory Supervisor Approval:

15.4

Dilution Factor:

ZMoisture:

4 QC Report for Laboratory Sample No(s): 88092731-88092733, 99

Duluth ANGB

Project:

88092731-88092733, 88092782-88092783 88092799-88092805, 88092672-88092674

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit %Recovery
	1,2,4-Trichlorobenzene	3920	Q.	2070	53	2090	53	2	23	38-107
B/N	Acenaphthene	3920	£	2510	64	2490	64		19	31-137
Laboratory	2,4-Dintrotoluene	3920	S E	2870	73	2940	75	2	47	28-89
Sample #	Pyrene	3920	S S	2290	58	2300	59	4	36	35-142
88092674	N-Nitroso-di-n-Propylamine	3920	QN	2640	67	2720	69	m	38	41-126
	1,4-Dichlorobenzene	3920	QN	1160	30	1110	28	7	27	28-104
		-	-	0000	-	0001			:	00.1
	Pentachlorophenol	7840	Q	8000	701	088/	101	7	7 +	1/-109
ACID	Phenol	7840	S	4590	59.	4470	57	ю	35	26-90
Laboratory	2-Chlorophenol	7840	S	4550	58	4310	55	2	20	25-102
Sample #	4-Chloro-3-Methylphenol	7840	QN QN	6200	79	6310	80	2	33	26-103
88092674	4-Nitrophenol	7840	Q	6160	79	6120	78	7	20	11-114

moisture is reported, results are presented on a dry-weight basis ~ ΙĘ NOTE:

MS = Spike Sample MSD = Spike Duplicate x 100 (MS + MSD)/2MS - MSD Relative Percent Difference (RPD)

Percent Recovery (PR) = $(MS \text{ or } MSD)-SR \times 100$

SR = Sample Result

NC = Not Calculated ND = Not Detected

NA = Not Applicable

SA = Spike Added (Concentration)

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88092673-88092674
WORK ORDER NO.: 1036

When samples 88092673 and 88092674 were analyzed, area counts for the last internal standard were below QC specifications. This analysis was repeated with the same result, indicating a matrix effect. Since this internal standard is used to calculate only dioctyl phthalate and a few - the highest boiling - of the polynuclear aromatic hydrocarbons (PNA's), and since these PNA's are nearly always accompanied by lower boiling PNA's, which were not present in these samples, this phenomenon should not affect the results of the analysis.

METHOD BLANK SUMMARY

test water post

sould, shipping

events show a

6. 1615年在144.3

Property of

Turden Alegan

Commission.

OR001 Job No: Client:

Attn:

Address:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, In.

Duluth ANGB Project:

Laboratory Supervisor Approval: Soil ug/KG 12-12-88 Sample Matrix: Conc. Unit: Date Reported:

Inclusive Sample Nos.	88092672-88092674	
CRDL	ı	
Conc	ı	
Compound (HSL, TIC or Unknown)	None Detected	
CAS Number	1	
Instru- ment ID	-4	
Fraction	BNA	
Date Analyzed	11-01-88	
File ID	80471	1718

418.1 INITIAL & CONTINUING CALIBRATION DATA

Job No.:

ORO01

Calibration Date:

10-22-88

Client:

ES Oak Ridge

Instrument I.D.:

Bausch & lomb Spectronic 270 1R

Attn:

Bill Hayden

710 S. Illinois Avenue

Unit:

mg/L

Address:

Suite F-103

Date Reported:

11-09-88

Oak Ridge, Tn. 37830

R≃

0.9975

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Laboratory Sample No(s).:

88092672-88092676 88092731-88092741

Standard	Concentration	Absorbance	/Continuous RF /Calibration /Verification
No. 1	1.2	0.170	
No. 2	1.8	0.266	RF = 5.59
No. 3	2.4	0.395	
No. 4	3.0	0.483	
Cont. Cal. No. 2 (Initial)	1.86	0.283	CCV = 103%
Cont. Cal. No. 2 (88092672-88092676)+QC	1.9	0.295	CCV = 106%
Cont. Cal. No. 2 (88092731-88092736)	1.9	0.295	CCV = 106%
Cont. Cal. No. 2 (88092737-88092741)	1.7	0.288	CCV = 104%
	*		

SEMIVOLATILE METHOD BLANK SUMMARY 4B

Job No.:

Client: Attn: Address: Work Order No.: Lab Sample No.: 04-02 Lab File ID: Soy71 Matrix: So,/

Level (low/med):

Date Analyzed: //- /0 - 28 Time Analyzed: 19:54

Instrument ID: Date Reported:

Project: Doluth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
DANG B-BG- SL5 - SD-1	88092672	S0473, E6343	11-10-88, 11-29-88
-BG-SL4-SD-1	88092673	50474, E6344	11-10-88, 11-29.88
-8G - 5L25 - 5D-1	88092674	E 6186, E6349	11-11-88, 11-29-88
-BG - SL25-SD-1	1 88092674MS	E6187, E6350	11-11-88, 11-29-88
-136 - SL25 - SD -1	1 88092674MUD	E2188, E6351	11-11-88, 11-29-88
Type agreement			
NAME OF THE PROPERTY OF THE PR			
- President and a second and a			
Prince of the second se			
And the state of t			
Secretarian			
STORY OF THE PROPERTY OF THE P			

PETROLEUM HYDROCARBONS

TPH-S-0063-88	Soil	mg/KG	9-24-88	10-13-88	10-22-88	11-01-88	2	24.3		Visor Applovai.	MWBrite.
QC Report No:	Sample Matrix:	Conc. Unit:	Date Received:	Date Prepared:	Date Analyzed:	Date Reported:	Dilution Factor:	£Moisture:	3 C C C C C C C C C C C C C C C C C C C	raporatory Supervisor Approvat.	Min
OR001		ES Oak Ridge	Bill Hayden	710 S. Illinois Avenue	Suite F-103	Oak Ridge, In 37830			Duluth ANGB		QC Report for Laboratory Sample No(s): 88092672-88092676 88092731-88092741
Job No.:		Client:	Attn:	Address:					Project:		ac Report f

No. Method E	ok SR	V V		i			1	
		50	MS	PR	MSD	1	PR	PR RPD
72 418.1	<100 <100	1320	1250	106	1290		98	98 3
S Blank 418.1 <100	00 <100	1000	1100	110	1000		100	100 10

1	
	basis.
	-y-weight
	Ġ
1	a a
	õ
	presented
	are
	results
	NOTE: If \$ moisture is reported, results are presented on a dry-weight basis.
	٠٠٠٠
	moisture
	80
	Ιξ
	NOTE:

NA = Not Applicable NC = Not Calculated ND = Not Detected	ration)
MS = Spike Sample MSD = Spike Duplicate	<pre>SR = Sample Result SA = Spike Added (Concentration)</pre>
Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2}$ X 100	Percent Recovery (PE) = $\frac{SSR - SR}{SA}$ x 100

· ...

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

ab Name: Engineering Science Contract:	•
Lab Code: Case No.: SAS No.:	_ * SDG No.:
ab File ID: >T1110 DFTPP Inject	tion Date: 11/10/88
instrument ID: 70 1 DFTPP Inject	tion Time: 8:19
m/e ION ABUNDANCE CRITERIA 51 30.0 - 60.0% of mass 198	% RELATIVE ABUNDANCE
68 Less than 2.0% of mass 69	1 0.0(0.0)1
69 Mass 69 relative abundance 70 Less than 2.0% of mass 69 127 40.0 - 60.0% of mass 198 197 Less than 1.0% of mass 198	0.0(0.0)1 47.2 0.0
197 Less than 1.0% of mass 198	100.
275 10.0 - 30.0% of mass 198 365 Greater than 1.00% of mass 198 441 Present, but less than mass 443	16.3 1.69 7.6

1-Value is % mass 69

443 | 17.0 - 23.0% of mass 442_

442 | Greater than 40.0% of mass 198_____

2-Value is % mass 442

51.3

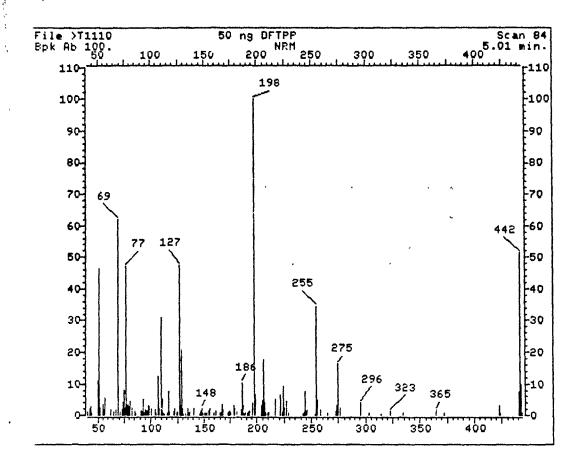
9.8(19,0)2|

HIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

-	•		·		
T	1	LAB	LAB	DATE	TIME
4		SAMPLE ID	FILE ID	ANALYZED	ANALYZED
•		=======================================		========	========
	01) >S0460	11/10/88	8:36
<i>7</i>	02		>S0461	11/10/88	9:39
§	03		>S0462	11/10/88	10:38
ì	04	88092609 1ml w/o1026	>S0463	11/10/88	11:38
ſ	05	88092610 1ml w/o1026) >S0464	11/10/88	12:38
ž.	06	88092742 BN 1ML + IS	>S0465	11/10/88	13:37
9	07	88092743 BN 1ML + IS	>S0466	11/10/88	14:37
	08	88092746 BN 1ml + IS	>S0467	11/10/88	15:55
Logger 1	09	88092747 BN 1ml + IS	>S0468	11/10/88	16:55
dayer.	10	88092765 BN 1ml + IS	>50469	11/10/88	17:55
	11	88092668 BN 1ml + IS	>50470	11/10/88	18:54
ร์	12	88092672-74 BLANK	>S0471	11/10/88	19:54
and the second	13			İ	 1
4	14			l	1
en	15				
% २ <u>८</u>	16				
3	17			l	
				1	
1			.		íI
1		<u> </u>	.		
- -					
4	22		.		
age	1 0	of 1			

FORM V SV

1/87 Rev.



THE TIEST OF HE OF HE STATE	ile: >T1110	Scan #:	84 Retn.	time:	5.01
-----------------------------	-------------	---------	----------	-------	------

n/2	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.
41.10	1,230	91.10	1.367	179.05	20.619	179.95	1.959	243.00	, 683
43.20	1.989	92.00		130.05		181.05			7.546
44.10	2.718	93.00		131.05		184.95		245.10	1.230
45.00	.668	94.10	. 607	133.05	.820	184.05	10.295	245.90	1.701
50.10	10.780	95.10	1.640	135.05	2.171	187.05	3.006	253.90	,410
51.10	46.477	96.00	1.427	136.05	.805	188.05	. 349	255.00	34.330
52.20	2.338	97.20	1.321	137.15	1.200	189.05	.698	256.00	4.889
55.10	3.416	98.00	3.295	141.05	2.035	190.95	.774	258.00	1.731
56.10	1.898	99.00	2.794	145.95	. 440	191.95	1.245	265.00	. 865
57.10	5.633	101.00	2.004	147.05	1.275	193.05	1.427	272.90	1.063
63.10	1.746	104.10	1.260	148.05	2.202	196.00	3.887	273.90	3.158
65.10		105.00		149.05	.790	198.00	100.000	274.95	16.262
67.10		105.90		151.05		199.00		276.05	2.308
69.00	61.889	107.00	12.101	152.15	. 334	204.00	3.067	276.95	1.108
71.10		108.10		153.05	.865	205.00	4.904	295.95	4.069
73.10		110.00		155.05		206.00		302.95	.805
74.10		111.00		156.05		207.10		314.55	.319
75.10		112.00		160.05		208.00		314.75	.334
76.00		113.00		101.15		210.10		322.95	1.367
77.10		116.00		165.15		210.80		334.05	.714
78.10		117.00		166.25	•	217.00		364.90	1.685
79.00		.18.05		167.05		221.00		372.10	.744
80.00		124.05		168.05		223.00		423.00	3.128
81.00		123.05		173.05		224.10		423.90	. 607
82.20		124.05		174.15		225.00		441.05	437
83.10		125.15		174.95		227.00		442.05	51.236
85.10	1.2/5	127.05	4/.221	176.05	.744	229.00	.759	443.05	9.778

86.90 86.90 .987 128.05 3.189 178.95 3.082 242.00 .456 444.05 .926 .729

Case No:	Calibration Date: 11/10/88					
Contractor: ENGINECKING	-Science	E line:	08:36			
Contract No:		Labora	tory ID:	>5046	60	
Instrument ID: 1		Initia	l Calib	ration	Date: 1	13 10/13788 7632
Minimum RF for SPEC is		Maxin	uŋ X Di	ff for	CCC is	ı
Compound	RF	RF	XOiff	CCC SF	200	
N-Xitroso-Dinethylamine	.90169	.79488	11.85			
•	1.15802					
•	1,11892					
Pheno:	1,41657					
Phenol-d5	1,22488					
Aniline	.54193					•
2-Chlorophenol	1.23175					
1,3-Dichlorobenzene	1.47535					
•	1.40530					
Benzyl Chlorice	-	•	•			
Benzyl Alcohol	.72906	.94048	29.00			
1,2-Dichlorobenzene	1.32240	1.43354	8.40			
2 Methylphenol	1.17367	1.31773	12.27			
3-8-4-Methylphenol	1.07139	1.31626	22.85			
bis(2-chloroisopropyl)Ether	2.15627	2.55875	18.67			
N-Nitroso-Oi-n-Propylamine	.84050	. 88791	5.64		**	
Hexachloroethane	.53840	.60326	12.05			
Dibronochloropropane	-	-	-			
Na trobenzene	.40312	. 43183	7.12			
Natrobenzene-dS	. 39137	. 43794	11.90			
2-Hitrophenol	. 24657	. 28269	14,65			
Isophorene	.74170	.73314	1.15			
bis(2-Chloroethoxy)nethane	. 49386	.56880	15.18			
2,4-Dimethylphenol	. 34849	. 37437	7,43			
Benzoic Roid	. 29725	.31264	5.18	ł		
2,4-Dichlorophenol	.56733	. 53236	6.16	*		
1,2,4-Trichlorobenzene	.36913	. 34523	6.47)		
Maphthalene	. 94589	. 93157	1.51			
4-Chloroaniline	. 36309	. 40428				
Hexachlorobutadiene	.20283	.16685	17.74			
1-Chloro-3-Methylphenol		. 33458				
2-Methylnaphthalene		.56145		I		

⁻ Response Factor from daily standard file at 60.00 mg/L

⁻ Average Response Factor from Initial Calibration Form VI

XDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:	Calibration Date: 11/10/88					
Contractor: ENLINEERING.						
Contract No:		Labora	tory IO	: >S	0160	
Instrument ID: L	•••••	Initia	l Calib	 rati	on Date: 10/13/8	38
Minimum RF for SPEC is		Haxin	iun I Di	ff f	or CCC is X	
Compound	RF	RF	XO1ff	CCC	SPCC	
Hexachlorocyclopentadiene	. 29568	.34502	16.69		##	
2,4,6-Trichlorophenol	.42280	.38741	8.37	*		
2,4,5-Trichlorophenol		. 45530				
2-Fluorobiphenyl		1.11319				
2-Chloronaphthalene	1.23784	1.18643	4.15			
2-" troaniline		.55085				
Dinethylphthalate	1,40629	1.33336	5.19			
2,6-Dinitrotoluene		. 38093				
Acenaphthylene		1.56995				
3-Hitroaniline		.51229				
2,4-Dinitrophenol		.17397			#X	
Acenaphthene	1.13011					
Dibenzofuran		1.55065				
2,4-Dinitrotoluene	.28418					
4-Hitrophenol	.28450				##	
Fluorene		1.00425				
Drethylphthalate		1,11405				
4-Chlorophenyl-phenylether		.49608				
4-Nitroaniline	.35956					
2,4,6-Iribronophenol	.21023					
1,2-Diphenylhydrazine	-	-	-			
Alpha-BHC	-	-	-			
Beta-BHC	-	-	-			
Garma-BHC	-		-			
Delta-BHC	-	-	-			
Heptachlor	-	-	-			
Aldrin	-	•	-			
N-Hitrosodiphenylanine	. 40286	. 44659	10.86			
4,6-Dinitro-2-Hethylphenol	.10514	•	-			
1-Bronophenyl-phenylether	.21301	. 20652	3.05			
Hexachlorobenzene	. 26273		6.44			
Pentachlorophenol		.14944	2.80			

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Contractor: ENLINEER, NG	Scien	£ line:	08:36		
Contract No:		Labora	tory ID	>50160	
Instrument ID: 1		Initia	l Calib	ration Dat	e: 10/43/88 විදුල්
Minimum RF for SPEC is		Maxim	iun, X Dir	ff for CCC	is X
Conpound	RF	RF	XD1ff	CCC SPCC	
Phenanthrene	1.03431	1.03521	.09		
Anthracene		1.07258			
Dı-n-Butylphthalate		1.71681			
1,1'-Dibronobiphenyl	•	-	•		
Fluoranthene	1.19047	1.13863	4.35	*	
Heptachlor Epoxide	•	•			•
Endosulfan I	-		•		•
4,4'-DDE	•	-	-		
Dieldrin	•	-	-		
Endrin	-	-	-		
4,4'-000	-	•	-		
Endosulfan II	-	-	•		
Endran Aldehyde	-	•	-		
4,4'-001	-	-	-		
Endosulfan Sulfate	-	-	-		
Dibutylchlorendate	•	-	-		
Benzidine	. 04023	.13617	238.48		
Pyrene		1.52745			
Terphenyl-d14		.99956			
Butylbenzylphthalate		1.14287			
3,3'-Dichlorobenzidine		. 23624			
Chrysene		1.03846			
Benzo(a)Anthracene		1.17410			
bis(2-Ethylhexyi)Phthalate		1.36663			
Di-n-octylphthalate		3,06801	9.81		
Benzo(a)Pyrene		1.31723	.28		
Benzo(b)Fluoranthene		1.39495	13.28		
Indeno(1,2,3-cd)Pyrene		1.41382	46.06		
Dibenzo(a,h)Anthracene		1.08282	23.78		
Benzo(k)Fluoranthene		1.40483	2.69		
Benzo(g,h,i)Perylene		1.14844			

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Ruerage Response Factor from Initial Calibration Form UI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

8B SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY



ab Code:	Case No.:		SAS No.:		SDG No.:	
PA Sample No. (Stand	ard): 5 5T	DOGES		Date A	nalyzed:	11/10/
ab File ID (Standar	a): 54	546¢		Time A	nalyzed:	08:
Instrument ID: 1						,
	IS1(DCB) AREA #		IS2(NPT) AREA #		IS3(ANT) AREA #	RT
	ERECESSES VVIV 1	======	**			=====
12 ·HOUR STD	92446	9.20	335872	12.82	189623	18.2
	184892	9.70	671744	13.32	379246	18.7
LIMIT			167.936	1232	94812	17.78
02 8809 2608 03 8809 2609 04 8809 290 05 8809 2743 BN 06 8809 2746 BN 08 8909 2747 BN 09 8809 2747 BN 10 8809 2745 BN 11 8809 266 BN 11 8809 266 BN 12	73139 67859 76986 68372 62190 66964 65730 67857 85308 78935	9.16 9.14 9.15 9.16 9.17 9.15 9.17 9.19 9.18			135605 151626 130397 121729 125975 125363 129049 157878 14640	18.0 18.0 18.0 18.0 18.0 18.0 18.0 18.0
13						
20 21 22						

Column used to flag internal standard area values with an asterisk

page __ of __

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name:			Contract:			
Lab Code:	Case No.:		SAS No.:		_ SDG No.	<u> </u>
EPA Sample No. (Stan	dard): 557	<u>-D&6</u> \$		Date 1	Analyzed:	11/10/88
Lab File ID (Standa	rd): <u>S</u>	\$46¢	<u>)</u>	Time A	Analyzed:	Ø8:36
Instrument ID: 1						
	IS4(PHN) AREA #	•	IS5(CRY) AREA #	RT	IS4(PRY) AREA #	RT
======== 12 HOUR STD	298825	20,92	221380	31.41	18477 [37.49
UPPER LIMIT		23,42	442760	31,9[369542	37.99
LOWER LIMIT	149413	22.42	110690	30,91	92386	36.99
EPA SAMPLE NO.	224852 209997 226005 199554 181474 194660 18792 20358 219790 267891 194664		161282 152410 152381 142419 134906 142275 137553 149934 192689 174454 208316	PPER LI	113686 /21350 /03388 /02631 //(911 /05457	37.36 37.34 37.35 37.35 37.35 37.37 37.36 37.36 37.35
IS5 (CRY) = Chry IS6 (PRY) = Pery			L	OWER LI	MIT = -50 $mal standa$	t

1729 FORM VIII SV-2

page __ of __

Column used to flag internal standard area values with an asterisk

10

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALISFATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Dame: Engineering Science Contract:,	Y
Lid Code: SAS No.: SDG I	No.:
Lab File ID: >T3110 DFTPP Injection Date	e: 11/10/88
Instrument ID: 70 1 DFTFP Injection Time	e: 20:59
m/e ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51 30.0 - 60.0% of mass 198	50.4 0.0(0.0)1 66. .5(.7)1 50.2 0.0 100. 6.7 18.8 1.94 6.7
443 17.0 - 23.0% of mass 442	

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

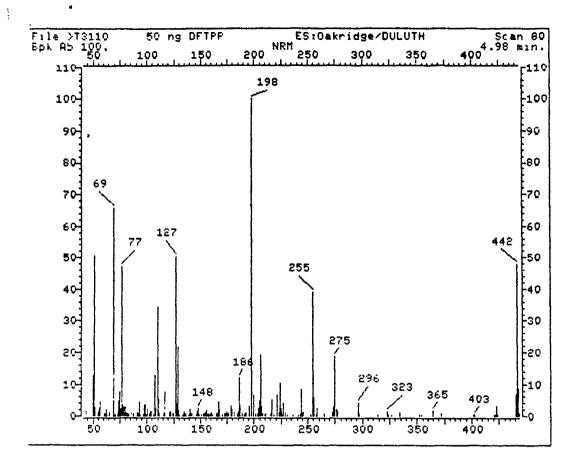
2-Value is % mass 442

1-Value is % mass 69

LAB	LAB	DATE	TIME
SAMPLE ID	FILE ID	ANALYZED	ANALYZED
		== ==================================	*=======
1 60 ug/ml BNA STD	>50472	11/10/88	
21 88092672 1ml wo 1036	>\$0473	1 11/10/88	22:15
31 88092673 1ml wo 1036	>50474	11/10/88	23:15
4; 88092806,24,35 BLANK AC	>S0475	11/11/89	0:14
5 88092806,24,35 BLANK N	>50476	11/11/88	1:14
6 88092806 AC W/c 1064) >S0477	1 11/11/88	2:13
7 88092806 EN w/o 1064	>S0478	11/11/88	3:12
8 88092824 AC W/o 1069	>S0479	11/11/88	4:12
9 88092824 BN w/o 1069	>50480	11/11/88	5:11
1 88192835 AC W/o 1072	>S0481	11/11/88	6:10
1 88092835 BN w/o 1072	>S0482	11/11/88	7:13
21 88091942 1ml	>S0483 -	1 11/11/88	8:12
311	1	1	l
41	1		l
511			l <u></u>
6			l
7			l
6			l
3			
.)			
1			
	1		

page 1 of 1

4278072



#i'Z	Int	F. / Z	Int.	r./z	Int.	m /z	Int.	m/z	Int
41.10	.565	94.00	.584	142.05	.782	187.05	3.354	246.00	1.385
44.10	1.272	97.10	.367	142.95	.707	189.05	.772	253.10	.367
50.10	12.454	98.16	3.570	146.05	.433	191.05	.490	255.00	38.973
51.10	50.419	99.00	3.495	147.05	1.366	191.95	. 848	256.00	5.718
52.10	2.638	100.00	.339	148.05	2.478	193.05	1.074	257.10	.424
55.10	1.168	101.00	2.120	149.05	.537	196.10	3.043	258.00	2.355
56.10	1.969	103.00	.782	151.35	.330	198.00	100.000	265.00	. 838
57.10	4.569	104.00	1.291	151.55	.311	199.10	6.651	273.00	1.253
61.10	.810	105.00	1.423	153.05	.914	200.00	.424	274.05	2.949
62.00	. 669	106.00	.509	154.05	. 631	201.50	. 659	275.05	18.775
63.10	2.091	107.10	12.492	155.05	1.262	203.10	. 659	276.05	2.270
64.10		108.10			1.686	204.10	2.544	277.05	1.300
65.10	.961	110.00	34.348	157.15	. 650	205.10	4.701	296.05	4.305
69.00			5.313		. 622	206.10	19.143	297.05	.612
70.10			. 669				3.128		
71.10					. 641	208.00	.744	323.05	1.507
73.10		117.00	7.414	161.05	1.102	210.00	. 320		. 264
74.10		122.05	. 989			211.10		326.95	. 339
75.10			1.528			216.00		334.05	1.055
76.20					.707			352.10	.480
77.10		125.15		167.05		218.10		354.20	.528
78.10		127.05		168.05		221.00		365.00	1.941
79.10			3.759			223.10		372.10	.801
80.10		129.05			. 688			402.00	. 283
81.10			1.771		.876			403.10	.528
82.10			. 367				. 349		. 358
23.00	1.148	131.15	.377	175.95	. 650	227.00	4.173	422.10	. 349

80 Retn. time: 4.98

File: >T3110 Scan #:

.415 424.00 85.16 .518 176.95 2.99e 231.00 .415 .8:8 154.05 **86.00 • .838 135.05 1.479 180.05** 1.988 237.00 ,301 441.05 6.679 87.10 1 00 .735 136.05 .669 181.05 1.093 240.90 .207 442.05 47.744 3518 443.05 8.686 91.00 .320 243.00 .999 137.15 .876 183.95 92.10 .895 140.15 ,292 185.05 1.554 244.10 8.271 444.05 .914 93.00 4.607 141.05 2.195 186.05 11.927 245.10 1.027

HS. Compounds

Case No:	Calibration Date: 11/10/88 Time: 21:15					
Contractor! ENGINEERING - SCIENCE						
Contract No:	Laboratory ID: >S0472					
Instrument ID:	Initial Calibration Date: 10/13/88					

Minimum RF for SPCC is

· The second sec

Maximum & Diff for CCC is &

Compound	RF	RF	XDiff	CCC	SPCC
N-Nitroso-Dimethylamine	.90169	.84528	6.26		
2-Fluorophenol .	1.15802	1.13505	1.98		
bis(2-Chloroethyl)ether	1.11892	1.18194	5.63		
Pheno 1	1.41657	1.32057	6.78		
Pheno 1-d5	1.22488	1.09362	10.72		
Aniline	.54193	.65068	20.07		
2-Chlorophenol	1.23175	1.36227	10.60		
1,3-Dichlorobenzene	1.47535	1.44367	2.15		
1,4-Dichlorobenzene	1.40530	1.36117	3,14	Æ	
Benzyl Chloride	-	-	-		
Benzy! Alcohol	.72906	.52301	28.26		
1,2-Dichlorobenzene	1.32240	1.43053	8.18		
2-Methylpherol	1.17367	1.79617	53.04		
3-6-4-Methylphenel	1.07139	1.56054	45.66		
bis(2-chloroiscoropyi)Ether	2.15627	2.62993	21.97		
N-Mitroso-Di-n-Propylamine	.84050	.93931	11.76		**
Hexachlorcethane	.53840	.59566	10.64		
Dibromochioroprepana	-	-	-		
Nitrobenzena	.40312	.51104	26.77		
N°trotenzese-d5	.39137	.43691	11.64		
2-Nitrophenol	.24657	.27535	11.67	•	
Isophorone	.74170	.79671	7.42		
bis(2-Chloroethoxy)methane	.49386	.58470	18.40		
2,4-Dimeth, Iphenoi	.34849	.34134	2.05		
Benzeic Acid	. 29725	.36417	22.52		
2,4-Dishlorophens:	.56735	.57253	.92	*	
1,2,4-Trichlorobenzene	.36913	.34492	6.56		
haphthalene	.94589	.92748	1.95		
4-Chloroaniline	.36309	.40177	10.65		
Hexachlorobutadiene	.20283				
4-Chloro-3-Methylphenol	.31360				
2-Methylnaphthalene	.56397		4.45		

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

2Diff - 2 Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VII Page 1 of 3

753

### Time: 21:15 ### Intract Hos	•						_
	Case No!		Celibr	ation D	te:	11/10/8	B •
	Contractor: ENGINEERING	Science	Time: 21:15				
Minimum RF for SPCC is	Contract No:		Labora	Laboratory ID: >S0472			
Compound RF RF XDiff CCC SPCC	Instrument ID: 2	-	Initia	l Calib	ratio	n Dete:	
	Minimum RF for SPCC i	is	Maxim	um X Di	ff fi	or CCC is	s Z
4,6-Trichlorophenol 4,5-Trichlorophenol 5,2897 5,5186 4,33 Fluorobiphenyl 1,27220 1,12147 Ethlorophenol 1,2784 1,20653 2,53 Hitroeniline 4,7288 5,6354 19,17 Imethylphthalate 1,40629 1,35064 3,96 6-Dinitrocoluene 37415 39903 6,65 Emaphthylene 1,8918 1,60610 4,92	Compound	RF	RF	XDiff	CCC	SPCC	
4,6-Trichlorophenol 4,5-Trichlorophenol 5,2897 5,5186 4,33 Fluorobiphenyl 1,27220 1,12147 Ethlorophenol 1,2784 1,20653 2,53 Hitroeniline 4,7288 5,6354 19,17 Imethylphthalate 1,40629 1,35064 3,96 6-Dinitrocoluene 37415 39903 6,65 Emaphthylene 1,8918 1,60610 4,92	Herach laracus lanentadione	79549	33102	11 05		***	
### ### ### ### ### ### ### ### ### ##							
Fluorobipheny 1.27220 1.12147 11.85							
Chloronaphthalene	•						
Hitroaniline							
### 1.60 1.60							
### ##################################	2,6-Dinitrotolyene						
### ### ### ### ### ### ### ### ### ##	Acenaphthylene						
### ##################################	3-Kitroaniline						
	2,4-Din:tropherol					**	
1.64131 1.59722 2.69 1.4-Dinitrotoleene	Acenaphthene						
	Ditenzofuran	1.64131	1.59722	2.69			
	2,4-Dinitrotoluene	.28418	.34273	22.71			
### 1.20739 1.15034 4.88 **Chiorophenyl-phenylether** .59183 .51273 13.77 **Nitroaniline** .35956 .45463 26.44 **A,6-Tribromopherol** .21023 .19636 6.60 **Q-Diphenylhyerazine**	4-hitropheno?	.28450	.28342	. 38		**	
-Chiorophenyl-phenylether	Fluorene	1.12850	1.02169	9.47			
### ##################################	Diethylphthalate	1.20939	1.15034	4.88			
A,6-Tribromopherol .21023 .19636 6.60 .2-Diphenvibyerazine .21023 .19636 6.60 .2-Diphenvibyerazine .21023 .19636 6.60 .22-Diphenvibyerazine .22-Diphenvibyerazine .22-Diphenvibyerazine .22-Diphenvibyerazine .22-Diphenvibrom .22-Diphenvib	4-Chiorophenyl-stenylether	.59193	.51273	13.57			
2-Diphenvilyerazine	4-Nitroaniline	.35956	. 45463	26.44			
	2,4,6-Tribromopheral	.21023	.19636	6.60			
######################################	1,2-Diphenvilyarazine	•	-	-			
######################################	Alpha-EHC	-	•	-			
### ##################################	Beta-B#C	-	-	-			
Addin	Gaena-BEC	•	-	•			
Addrin	Delta-8:10	-	-	-			
Addrin	Keptechior	•	-	-			
- Response Factor from daily standard file at 60.00 mg/L - Average Response Factor from Initial Calibration Form VI	Aldrin	•	-	-			
- Response Factor from daily standard file at 60.00 mg/L - Average Response Factor from Initial Calibration Form VI	N-Kitrosociphenylarine	.49286	.45927	14.00			
-Bromophenyl-phenylether .21301 .20736 2.65 exachlorobenzene .26273 .24332 7.39 entachlorophenol .14536 .14424 .77 = - Response Factor from daily standard file at 60.00 mg/L - Average Response Factor from Initial Calibration Form VI	4,6-Dinitro-2-Methylphenol	.10514	-	-			
exachlorobenzene .26273 .24332 7.39 entachlorophenol .14536 .14424 .77 =	4-Bromophenyl-phenylether		. 20736	2.65	;		
F - Response Factor from daily standard file at 60.00 mg/L - Average Response Factor from Initial Calibration Form VI	Hexach lorobenzene	. 26273	. 24332	7.39)		
- Average Response Factor from Initial Calibration Form VI	Pentachlorophenol	.14536	.14424	.77			
- Average Response Factor from Initial Calibration Form VI	,						
	RF - Response Factor fro	om daily st	andard f	ile at	60.	00 mg/L	
Diff - 4 Difference from original average or curve	RF - Average Response Fa	actor from	Initial i	Calibrat	ion	Form VI	
	ZDiff - Z Sifference from a	original av	erage or	curve			
·		•	-		+-	n Parfa	rmacom fino

Form VII Page 2 of 3

HŠL Compounds

Case No:	Calibration Date: 11/10/88
Contractor: ENDINEERING-SCIENCE	Time: 21:15
Contract Ho:	Laboratory ID: >S0472
Instrument ID:	Initial Calibration Date: 10/27/88

Minimum RF for SPCC is

Maximum & Diff for CCC is &

Compound	RF	RF	1Diff	CCC	SPCC
Phenanthrene	1.03431	1.03868	.42		
Anthracene	1.05155	1.07827	2.54		
Di-n-Butylphthalate	1.51956	1.73597	14.24		
4,4'-Dibromobiphenyl	•	-	•.		
Fluoranthene	1.19047	1.16040	2.53		
Heptachlor Epoxide	-	-	-		
Endosulfan I	-	-	-		
4,4'-DDE	-	-	-		
Dieldrin	-	-	-		
Endrin	-	-	-		
4,4′-DDD	-	-	-		
Endosulfan II	-	-	-		
Endrin Aldehyde	-	-	-		
4,4'-DDT	-	•	-		
Endosulfan Sulfate	-	-	-		
Dibutylchiorendate	-	•	-		
Benzidin e	.04023	.10769	167.68		
Pyrene	1.56086	1.50776	3.40		
Terphenyl-d14	1.05835	.99505	5.98		
Butyltenzylphthelate	1.03390	1.18978	15.08		
3,3'-Dichlorobenzidine	.13689				
Chrysene	.99655	1.04268	4.63		
Benzo(a)Anthracene	1.10407	1.20799	9.41		
bis(2-Ethylhexyl)Phthalate	1.21073	1.39309	15.06		
Di-n-octylphthalate		3.16060		*	
Benzo(a)Pyrene		1.31963			
Benzo(s)Fluoranthene		1.75277			
Indeno(1,2,3-cc)Pyrene		1.29037			
Dibenzo(a,h)Anthracene		1.04917			
Lenzo(k)Fluoranthene		1.04507			
Benzo(g,h,i)Perylene	.89761		3.65		

RF - Response Factor from daily standard file at 60.00 mg/L

Form VII Page 3 of 3

RF - Average Response Factor from Initial Calibration Form VI

[☆]Diff - ☆ Difference from original average or curve

ECC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

		ard): >50472		Date An	.alyzed:11/1	0/88
str	ument ID:	70 1		Time An	alyzed: 21:	15
					-	
	•	IS1(DCB)	IS2(NFT)	1 1	IS3(ANT)	
	1	AREA # RT	AREA #		AREA #	RT
	•		•		•	***
	1 12 HOUR STD	•	9 308277.	•		
	•		•		•	
	UPPER LIMIT	•	616554.		342604.	
	•	*******	•		•	
	LOWER LIMIT	42950. 	154139.		85651.	
	1			= = = = =	_=================	
	SAMPLE	!	İ	1	I .	
	NO.	======== =====		1		
0.4	•	•	•		,	
	•	•	9 281128.			
	188092673 1ml		•		·	
	188092806,24,					
	188092806,24,					
	188092806 AC					
	188092806 BN					
	188092824 AC	•		•		
	88092824 BN 88092835 AC	•	•			
	188092835 BN	•				
	188091942 1ml		•	•		
12	•	69649. 9.1	0 252310.	1 12./5	81564.*	10.
13	, ,		-	!		
14			_	i		
			i			
16	!		! <u></u> -			
20	1					
			<u> </u>			
			!	!	· · · · · · · · · · · · · · · · · · ·	

Column used to flag internal standard area values with an asterisk page 1 of 1

FORM VIII SV-1

1/87 Rev.

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

ab	Name: Engineering	Science	Contract:

Lab Code: ES01 Case No.: ____ SAS No.: ____ SDG No.: ___.

Jab File ID (Standard): >50472 Date Analyzed:11/10/88

.nstrument ID: 70 1 Time Analyzed: 21:15

	IS4(PHN)		IS5(CRY)		IS3(PRY)	
!	AREA #	RT	AREA #	RT	AREA #	RT
12 HOUR STD	274056.	22.92	203777.	31.40	173587.	37.46
IS HOOK DID!	2/1000.	*****	203///.	31.10		37.4U
UPPER LIMIT	548112.		407554.		347174.	
=======================================	===××××××	*****	******		*******	
LOWER LIMIT	137028.		101888.		86793.	
	****	****	*****	EEREEE		# # # # # # #
EPA SAMPLE				,		
1 NO. 1						
=======================================				=====	========	=====
88092672 1ml		22.88		31.34	•	
88092673 1ml		22.88		31.33	•	
188092806,24,1		22.88	•	31.32	•	37.36
188092806,24,1		22.87		31.33	•	37.34
88092806 AC	242987.	22.89	•	31.33	•	37.34
188092806 BN	219115.	22.88	•	31.33	•	37.36
88092824 AC	241291.	22.88	•	31.33	•	37.36
188092824 BN	251133.	22.88	•	31.33	•	37.32
88092835 AC	226939.	22.87	•	31.33	•	37.33
188092835 BN	230830.	22.87		31.33	•	37.33
88091942 1ml	190824.	22.88	106536.	31.32	6492.*	37.33
					ļ	
			! 	!	ļ	ļ
				<u> </u>	! 	!
!!			! 	<u> </u>	!	<u> </u>
<u> </u>			! 	<u> </u>	!	
			!	<u> </u>	!	ļ ———
<u> </u>			l	ļ——		<u></u>
				!	!	!
<u> </u>				ļ 	l	!
ļ		<u> </u>	!	!	!	ļ
. I I		l	l	l	l	l

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal stansard area.

LOWER LIMIT = - 50%

of internal standard area.

Column used to flag internal standard area values with an asterisk page 1 of 1

FORM VIII SV-2

1/87 Rev.

GC/MS TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFTFP)

Lase No. 123456

Contractor Engineering Scien Contract No. 99999999

Instrument ID #1

Date / Time 11/10/88 21:15

Lab 10)04110::02

Data Release Authorized By: Rauce

i n/z	: ION ABUNDANCE CRITERIA		XRELATIVE ABUNDANCE
1 51	30.0 - 60.01 of mass 198	' 	49.03 OK
1 68	i less than 2.0% of mass 69	1	0.00 OK (0.00) #1
69	l mass 69 relative abundance	ł	69.74
1 70	l less than 2.0% of mass 69	1	0.00 0k (0.00) #1
1 127	1 40.0 - 60.0% of mass 198	1	45.17 OK
197	l less than 1.0% of mass 198	ì	0.00 OK
: 198	base peak, 100% relative abundance	1	100.00 OK
199	1 5.0 - 9.0% of mass 198	}	6.34 OK
275	: 10.0 - 30.0% of mass 198	į	20.96 OK
: 365	i greater than 1.00% of mass 198	ļ	1.94 ûk
1 441	i present, but less than mass 443	}	13.00 ûk
	i greater than 40.0% of mass 198	!	47 49 ñr

10/12/13

old Sycod

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

1 17.0 - 23.0% of mass 442

#1 - Value in parenthesis is % mass 69.

(17.13) 12

15.84 ÛK

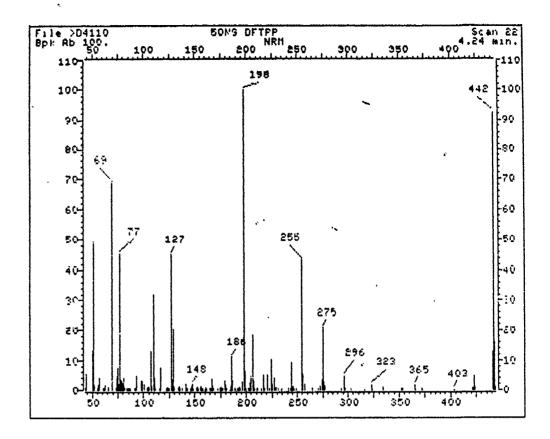
#2 - Value in parenthesis is * mass 442.

:SAMPLE IO!	LAB_IO	_DATE_OF_ANALYSIS_;	TIME_OF_ANALYSIS_	_1
ISONG OFTPP , I	<u> </u>	11/10/88	21:15	_;
Waskstd	E6179		2:31	1
BUC 12712-47-AC	E6180		عاد: 22	
1'MC	E6181		23:21	[] \
1, W75	E6182	11/11/88:	00:16	[i \
BUK: 2742-47BU	Eb183		01.11	
<u>/ / / / </u>	E2184		02.06	けいっさ
C 2M"	EV135		03.01	175004
שתו צירשכף שמו	- EU186		03.56	175 ovt ,
1'M'	Eb/87	i	67:00	
UW.	E6188		07:54	TENT)
8072772 BN	1 FL189		08:50	TSort /
ii				1
		i		-
				_

wother

vse

Fûkn û



File:)04110 Scan #: 22 Rein. time: 4.24

n/z	int.	n/z	int.	n/z	int.	n/z	int.	n/z	int.
43.10	. 6 22	100.95	2.023	153.95	.594	199.00	6.338	257.95	2.108
44.00	5.545	103.05	.736	154.95	1.004	200.00	. 396	265.05	.707
5û. 1û	13.142	104.05	1.132	155.95	1.542	201.40	. 453	270.85	. 297
51.00	49.031	104.95	.962	157.05	. 121	203.00	. 495	272.95	1.344
52.10	1.782	107.05	12.944	157.95	. 368	204.00	2.32Û	274.05	3.324
55.10	. ĠŨŝ	108.05	1.528	159.95	.736	205.00	4.35?	275.05	20.965
56.00	1.768	110.00	31.857	161.05	1.019	206.00	10.263	276.05	2.787
57. Ú Ů	4. 2Ú1	111.00	4,173	161.85	.297	207.00	3.140	277.05	1.287
61.10	. 693	111.90	. 396	164.95	.721	208.00	.651	293.00	.368
62.10	.523	116.00	. 863	165.85	. 523	210.00	. 325	296.00	4.937
63.10	1.853	117. 0 0	7.399	166.95	3.706	210.90	. 806	297.ÚÛ	.665
65.1Û	. 990	122.00	.750	167.95	1.301	215.00	. 283	303.00	.539
67.65	. 283	122.90	1.174	169.05	.340	216.90	5. û5û	316.00	. ?26
68.95	66.737	124.00	.594	171.95	.552	218.00	. 750	323.10	1.825
72.95	.467	125.00	. 538	172.85	. 481	221.ÛÛ	5.206	324.00	,226
74.05	4.513	127.00	45.169	174.05	.863	222 .9 0	.792	334.05	.934
74.95	7.568	128,00	3.522	175.05	1.174	224.00	10.327	34û. 85	.2 4 û
76.05		129.00	20.314	176.05	.467	225.00		352.05	. 439
77.05	45.367	130,00	1.500			227.00		352. <i>9</i> 5	.368
78.05		131.90		178.95		220.00		354.ŪS	.453
79.65		134.00		180.05		229.00		365.05	1.938
79.95		135.00		181.05		231.00		365.75	.1 9 8
80.95		136.00		183.95		234. OŬ		372.00	.721
92.05		137.00		185.05		234.90		373.00	.184
83. ÚS		141.00		186.05		241.85		402,90	,552
84.05		142.00		197.05		243.05		404.10	.198
84.95		142.90		166.65		244.05		121.05	.481
85, 9 5		146.00		189.05		244.95		122.05	.467
At AF	FAA	*#7.45	1 76.	enh he	277	SAP OF	4 763	157 SF	1 555

 91.05
 .863 148.00
 2.249 191.95
 .622 246.85
 .311 423.95
 .934

 92.05
 .651 149.00
 .421 193.05
 .948 248.95
 .368 491.05
 13.000

 92.95
 4.767 151.20
 .255 194.05
 .269 254.95
 43.174 492.05
 92.488

 98.05
 3.169 151.50
 .269 196.05
 2886 255.95
 5.588 493.05
 15.844

 98.95
 3.041 153.00
 1.202 197.90 100.000 257.05
 .382 491.05
 1.146

THE REPORT OF THE PROPERTY OF

Stemen y on the

Case No:	Calibration Date: 11/10/88				
*****************	***				
Contractor:	Time: 21:31				

Contract No:	Laboratory ID: >E6179				
Instrument ID:	Initial Calibration Date: 10/13/88				

Minimum RF for SPCC is

これのでは、これのではないできるからないまでいることできないという

Maximum X Diff for CCC is X

Compound	RF	RF	101ff	233	SPCC
N-Hitroso-Dinethylamine	1.24043	.93312	24,77		
2-Fluorophenol	1.41912	1.23197	13.19		
bis(2-Chloroethyl)ether	1.41737	1.18284	16.55		
Phenol	1.78209	1.57668	11.53	*	
Phenol-d5	1.35470	1.43983	6.28		
Aniline	.74553	. 12526	42.96		
2-Chiorophenol	1.32089	1.34603	1.90		
1,3-Dichlorobenzene	1.51101	1,47299	2.52		
1,4-Dichlorobenzene	1.51574	1.48391	2.10	¥	
Benzyl Chlorade	-	•	•		
Benzyl Alcohol	.56944	.67502	18.54		
1,2-Dichlorobenzene	1.45179				
2-Methylphenol	1.42392	1.60074	12.42		
3-8-1-Methylphenol	1.58422	1.23200	22.23		
bis(2-chloroisopropyl)Ether	2.35722	2.09370	11.18		
N-Hitroso-Di-n-Propylamine	1.13410	1.24582	9,85		**
Hexachloroethane	.70056	.72571	3,59		
Dibromochloropropane	•	-	-		
Nitrobenzene		.56789			
Hitrobenzene-dS		.51104	2.33		
2-Hitrophenol	.22040		15.76	¥	
Isophorone	.87207	.88978	2.03		
bis(2-Chloroethoxy)methane	.58240	.61302	5.26		
2,4-Dimethylphenol	.40862	. 35683	12.67		
Benzoic Acid	. 29595	.31677	7.04		
	. 53135			¥	
1,2,4-Trichlorobenzene	.31739				
Kaphthalene	.98196	1.02672	1.56		
4-Chloroaniline		. 34566			
Hexachlorobutadiene		.19507	4.59	•	
4-Chloro-3-Hethylphenol	. 28631	.32720	14.28	¥	
2-Methylnaphthalene	.54468	.60896	11.80		
					••••

RF - Response Factor from daily standard file at 60.00 mg/L

PF - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:		Calibration Date: 11/10/88 Tine: 21:31 Laboratory ID: >E6179 Initial Calibration Date: 10/13/88						
Contractor:								
Contract No:								
Instrument 10:								
Mininum RF for SPCC is	i	Haxir	nun X Di	ff f	or CCC 1	5 X		
Conpound	RF	RF	XDiff	CCC	SPCC			
Hexachlorocyclopentadiene	.33289	.38811	16.59		**			
2,4,6-Irichlorophenol	.32295							
2,4,5-Irichlorophenol		.54188						
2-Fluorobiphenyl	1.26699	1.23849	2,25					
2-Chloronaphthalene	1.24653	1.20563	3.28					
2-Mitroaniline	. 63129	.57211	9.37			٠		
	1.33033		8.36					
2,6-Dinitrotoluene	.31816		15.73					
• •	1.65820		.61					
3-Mitroaniline	, 63702							
2,4-Dinitrophenol	.05753				**			
	1.12644			¥				
	1.50204							
2,4-Dinitrotoluene		. 38649						
4-Nitrophenol		.12552			¥¥			
fluorene		1.11808						
Dzethylphthalate		1.38973						
1-Chlorophenyl-phenylether	.48214							
1-Mitroaniline		.29184						
2,4,6-Tribronophenol	.14218	.07285	18.76					
1,2-Diphenylhydrazine	-	•	•					
R1pha-BHC Beta-BHC	-	•	-					
beta-oni. Ganna-BHC	-	•	-					
Delta-BHC	-	-	-					
Heptachlor	-		_					
Aldrin	•	•	-					
I-Nitrosodiphenylanine	.41983	.43769	2.70					
1,6-Dinitro-2-Hethylphenol	.08606	. 19197	- 2,10	-				
1-Bronophenyl-phenylether	.22979	,24910	8.40					
Hexachlorobenzene	.28768		11.80					
Pentachlorophenol	.11390		9.90	¥				

⁻ Response Factor from daily standard file at 60.00 mg/L

Rr - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:			Calibration Date: 11/10/88					
Contractor:			1:ne: 21:31					
			itory ID	: >[6179				
Instrument ID:			Initial Calibration Date: 10/13/88					
Minimum RF for SPCC is		Maxir	num X Di	ff for CCC is X				
Conpound	RF	RF	XDiff	CCC SPCC				
Phenanthrene	1.07960							
Anthracene		1.07661						
Dı-n-Butylphthalate		1.90234			•			
1,1'-Dibronobiphenyl		•	•					
Fluoranthene	1.17568	1.12969	3.91	*				
Heptachlor Epoxide	•		•	٠				
Endosulfan I		•	•	-				
4,4'-006	•	•	•					
Dieldrin	•	•	-					
Endrin	•	-	-					
4,4'-000	-	-	-					
Endosulfan II	•	•	-					
Endrin Aldehyde	•	•	•					
4,4'-0Di	-	-	-					
Endosulfan Sulfate	-	•	-					
Dibutylchlorendate	-	•	-					
Benzidine	.03775	.01689	55.26					
Pyrene		1.60917						
Terphenyl-d14		1.14155						
Butylbenzylphthalate	1.15097	1.27104	10.43					
3,3'-Dichlorobenzidine	.12990	.22399	72.44					
Chrysene	1.01423	. 98668	2.72					
Benzo(a)Anthracene	1.09006	1.14817	5.33					
bis(2-Ethylhexyl)Phthalate	1.34247	1.52468	13.57					
Di-n-octylphthalate	3.72331	3,50446	5.88	*				

- Response Factor from daily standard file at 60.00 mg/L

1.27071 1.28254

1.48902 1.55652

.82543 .58023

.78966 .92392

1.51900 1.30665

.74580 .93055

.93 ×

4.53

29.71

17.00

13.98

RF - Ruerage Response Factor from Initial Calibration Form VI

XD:ff - X Difference from original average or curve

Benzo(a)Pyrene

Benzo(b)Fluoranthene

Indeno(1,2,3-cd)Pyrene

Dibenzo(a,h)Anthracene

Benzo(k)Fluoranthene

Benzo(g,h,i)Perylene

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

form VII Page 3 of 3 1743

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name				Contract:			•
Lab Code		Case No.:		SAS No.: SDG No.			
EPA Samp	A Sample No. (Standard):			٠.	Date 2	Analyzed:	
Lab File	ID (Standar	rd):			Time I	Analyzed:	
Instrume	nt ID:	<u></u>			•		
		IS1(DCB)		IS2(NPT)		IS3(ANT)	
		AREA #	RT	AREA #		AREA =	RT
	12 ·HOUR	!	 ======				======
	STD_	80004	7.95	277927	11.44	147615	16.8)
	110000	========	====== 	=====================================			======
	LIMIT	160008	 	555854	 	295230	
	LOWER	40002		138963		73807	
	LIMIT	70000		13014)		1 3001	
	EPA SAMPLE						
		1		======================================			=====
		<u>58778</u>	7.91	·		100952	16.78
02		66908	7.94		11.40		1679
03	· —————	56363	7.93	184481	11.39	98244	1678
04 05	BLANCBN	63077	7.94	217275	11.39	1/3/93	16.78
06	· ————	1 55068 1 48196	3.5	1 166317	11,73	032956	1 <u>16.31</u> 11679
	88092674	59433	7.95	26/217	11.39	105202	V 6.78
08		64284	795	334777	11.40	116209	16.79
09	MJD	62572	8.01	225378	11.45	11/225	16.84
10 11	X09272RN	47627	7.92	169898	11.40	87805	16.78
12							
13				ļ		<u></u>	
14 15	•						
16	·		·			<u> </u>	
17	· ————————————————————————————————————						
18	·						
19	•						
20	' 						<u> </u>
21					<u> </u>		ļ
22 TS1 (1	DCB) = 1,4-i	lichlorober	1	<u> </u>	PPP TT	MIT = + 10	0% of
	NPT) = Naphi					standard	
	ANT) = Acena		В	L	OWER LI	MIT = -50	k of
•	•			iı	nternal	standard a	area.

Column used to flag internal standard area values with an asterisk

page _ of _ 1744 FORM VIII SV-1

10,

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name				Contract:			, į		
Lab Code		Case No.:		SAS Nó.:	3.00	SDG No.:	·		
EPA Sample No. (Standard): Date Analyzed:									
Lab File	ID (Standa:	rd):			Time A	Analyzed:	•		
Instrument ID:									
		IS4 (PHN) AREA #	RT	IS5(CRY) AREA #	RT	IS4(PRY) AREA #	RT		
	12 HOUR STD	263553	21.39	133503	29.76	92779	346C		
	UPPER LIMIT	407106		267006		185558			
	LOWER LIMIT	101776	225#1··~	66751	882222	<u> 46389</u>			
	EPA SAMPLE NO.								
· 01 · 02 03	BLANK AC MS	133072 151997 126575	21.70 21.70	77362	29.77 29.77 29.72	49996 63415 53440	34.55 34.57 34.57		
04 05 06	BLANIC BN MS MSD	13/863	21.36 21.39 21.37	700753 83749 70121	29.73 29.71	67918 × 43872	34.55		
08 09		142850 163029 166079	21.38	91773	<u>29.72</u> <u>29.71</u> <u>29.77</u>	38042X 3462X 1356X	34.60		
11 12		122797	21.36	73886	2972	<u> </u>	34.7.6		
13 14 15									
16 17 18									
19 20 21									
IS5 (C	PHN) = Phena CRY) = Chrys	sene-d12	10	0	f inter	MIT = + 10 nal standa	rd area		
	PRY) = Pery:	•	rnal st:	0	f inter	MIT = - 50 nal standa s with an	rd are		

ed to flag internal standard area values with an aster?

page __ of __

file: BJ&AS 24 Oct 88

VOLATILE ORGANICS INITIAL CALIBRATION DATA

abName:		C	ontract:_			-		
ab Code: Case	Case No.: SAS No.: SDG No.:							
nstrument ID.: Carlynak	Calibr	ration [Date(s):_	10/4	188	9/23	1/89	
LAB FILE ID:	RRF 10=	24 , 50	2 RRF	F20= 25	251		·	
RRF 50= 26 52		ک 33		200- <u>28</u>	154			
							×	SD
COMPOUND	RRF10	!		RRF100	RRF200	RRF	RSD	İ
Benzyl chloride	0.31	0.27	0.34	0.40	0.30	0.32		
bis (2-chloroethoxy	6.03	0.03	0.05	0.04	0.06	0042	22	
methane bis (2-chloroispropyl				!!		'		
ether	0.24	0.27	0.26	0.24	0.50	0.26	9-6	
Bromobenzene	1 1.7	1.4	1.2		7.3	1.4	14	0.19
Bromodichloromethane	1 3.7	4.2	4.0	4,4	3,3	3.9		0.43
Bromofo m	1.1.	7.9	2./	2.5	2.0	1.9	24	0.51
Bromomethane	.	0.43	017	0.28				
Carbon tetrachloride	1 4.4		4,5	5.0		4,5		0.42
Chloroacetaldehyde	10.001	0.002	0.001	0.0005	0.0005	001	66	
Chlorobenzene	1 /.3	1,5	1,5	1 <u>/.6</u> 1	1.2	1.4	1	0.16
Chloroethane	1 0,42	0.43	0.46	0.49	0.41	0.47		ļ
Chloroform	! <u> </u>	5.0	4.4	4.9	3.6	4.4		0.5
1-Chorohexane	1_1.7	<u> </u>		! <u>_/.2</u> _!	0.97	1 / 2	'	02
2-Chloroethyl vinyl ether_	10.03	1 <u>0.03</u> 1	0.05	0.04	0.06	0.042		
Chloromethane	; C.61	0.46	0.54	0.62	0.59	0.55		0.00
Chloromethyl methyl ether	1012	0.21	0.22	0.10	0.15	017		7.1
o_,m_,& p_Chlorotoluenes _	1_5.8	4.9	4.0	1_4.3	3.8	4.6	<u> </u>	0.81
Dibromochloromethane	1_3.0	3,8	4./	4.6	3.3	3.8	12	0.6
Dibromomethane	1 3.9	3.3	2,8	3,2		3,2		6.र्ने ह
1,2_Dichlorobenzene	1 2.4	2.1	2.8			2.6		0.30
1,3_Dichlorobenzene	1 4.1	-24	2.4	2.5		2.3		0 25
1,4_Dichlorobenzene	1-2-5	1.5		1 2.4		123		c.28
Dichlorodifluormethane	10.51				0.64	-		0.2
1,1_Dichloroethane	3.2	2.6	2.4	2.8	2./	23	12/	0.2
1,2_Dichloroethane	. '	3./	2.8	4,9	2,3	3.3	30	0.99
1,1_Dichloroethylene	1 2.6	2.7	2.6	3.0 2A	2.3	2.6	10	0 2
trans_1,2_dichloroethylene	35	7.0	2,6	3-1	2.4	7//	127	124
Dichloromethane	2.2	2.6	2.5	2.8	<u></u> 	2.4	13	0.3
1,2_Dichloropropane	1.8	2.1	2.0	2.3	1.6	1.9	13	024
1,3_Dichloropropylene 1,1,2,2_Tetrachloroethane_		9,5	7.9	8.4	5.4	7.7	13	1.0
1,1,2,2_Tetrachloroethane_ 1,1,1,2_Tetrachloroethane_		5.6	4.5	4.8	3.8	3.5	25	1.3
Tetrachloroethylene	7.7	8,5	7.9	8.4	5.9	7.7	13	
i,i,i_Trichloroethane	3.1	3.5	3.2	3,6	2.6	3.2	12	, 0.3
1,1,2_Trichloroethane	7.9	6.5	5.2	5.5	4.4	5.9	23	1.3
Trichloroethylene	3.4	4.0	4.0	4.4	3./	3.8	14	c.5
Trichlorofluormethane	2.6	2,5	2.4	2.7	2.1	2.5	9	0.25
Trichloropropane	1.5	2,3	1.8	2.1	1,7	2./	16	0.33
Vinyl chloride		0.76	0.77			0.78		5.00

file: 8020CAL 21 Oct 88

VOLATILE ØRGANICS INITIAL CALIBRATION DATA

LabName:		-					
Lab Code:C	Case No.:	· · · · · · · · · · · · · · · · · · ·	SAS No.		\$00	5 No.:	
Instrument ID.: CARbor	ak_ Calibr	ation [)ate(s):_	10/4/8	<u> </u>		
LAB FILE ID: RRF 50= 26	RRF 1 0=_ RRF 1 00=			20= <u>2</u> 200= <u>2</u>			
COMPOUND	RRF10	RRF2Ø			RRF200		% RSD
Benzene	4,8	4,0	4.3	4.2	<u>4. j</u>	4.3	7
Chlorobenzene	5.0	4.9	<u>4.7</u>	5.0	5.4	5.0	5
1,Z_Dichlorobenzene		3.7	4.0		The second second	3.8	·
1,3_Dichlorobenzene		<u> </u>	4.4	4.6		4.4	<u>~</u>
1,4_Dichlorobenzene		3.6	3.6			3.6	<u>ک</u> ـــــ
Ethyl Benzene		3,5	<u>-2/</u>	3,5		3,4	
Toluene	3.8	4.0		3,7		3.8	
XVI ADAC		73 !	// !	/2 !	//	! /2	! 14

This page intentionally left blank.



This page intentionally left blank.

600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

Job No.: ORO01.00

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8-11-88.

Sample Preparation Data

B8081749	
88081749 DANGB8-MW19-SS1 BA-I 8-11-88 9-07-88 88081749 DANGB8-MW19-SS1 CD-X-F 8-11-88 9-07-88 88081749 DANGB8-MW19-SS1 CR-Y-F 8-11-88 9-07-88 88081749 DANGB8-MW19-SS1 YB-F 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 MOIS 8-11-88 8-17-88 8-17-88 88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 8-20-88 8-8081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 8-8081749 DANGB8-MW19-SS1 8080 8-11-88 8-20-88 8-8081749 DANGB8-MW19-SS1 8080 8-11-88 8-20-88 8-8081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 8-20-88 8-8081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-08-88 9-18-88 8-8081750 DANGB8-MW19-SS2 CR-Y-F 8-11-88 9-07-88 8081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 8081750	Date*
88081749 DANGB8-MW19-SS1 CD-X ← 8-11-88 9-07-88 88081749 DANGB8-MW19-SS1 CR-Y ← 8-11-88 9-07-88 88081749 DANGB8-MW19-SS1 PB-F 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 MOIS 8-11-88 8-17-88 88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 88081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 88081749 DANGB8-MW19-SS1 8020 8-11-88 9-08-88 9-18-88 88081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 CD-X ← 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-Y ← 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-16-83 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-09-88 9-18-83 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-08-88 9-18-83 88081750 DANGB8-MW19-SS3 BA-I 8-11-88 9-08-88 9-18-83 88081751 DANGB8-MW19-SS3 CR-Y 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	
88081749 DANGB8-MW19-SS1 CR-FF 8-11-88 9-07-88 88081749 DANGB8-MW19-SS1 PB-F 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 MOIS 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CD-FF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-FF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 FB-F 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 9-08-88 9-18-88 <	
88081749 DANGB8-MW19-SS1 PB-F 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 M0IS 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CD-XF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-YF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88 88081750 DANGB8-MW19-SS2 8020 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-1-88 9-07-88 8808	
88081749 DANGB8-MW19-SS1 418.1 8-11-88 9-09-88 9-11-88 88081749 DANGB8-MW19-SS1 MOIS 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8020 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CD-X-F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-X-F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 8 88081750 DANGB8-MW19-SS2 8020 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-08-88 9-18-88 <td></td>	
88081749 DANGB8-MW19-SS1 MOIS 8-11-88 8-17-88 88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 8 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 CD-X F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-X F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-X F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 YB-F 8-11-88 9-16-83 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 8 88081750 DANGB8-MW19-SS2 8020 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 CR-X F 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3	
88081749 DANGB8-MW19-SS1 8010 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-FF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 8 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 8 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 CR-FF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-FF 8-11-88 9-09-88 9-16-88 88081751<	
88081749 DANGB8-MW19-SS1 8020 8-11-88 8-20-88 8 88081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 CD-XF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-YF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 418.1 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-YF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-YF 8-11-88 9-09-88 9-16-88 88081751 DANGB8-MW19-SS3 CR-YF 8-11-	
88081749 DANGB8-MW19-SS1 8080 8-11-88 9-08-88 9-18-88 88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-YF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-09-88 9-16-83 88081750 DANGB8-MW19-SS2 418.1 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-YF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-YF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	3-20-88
88081750 DANGB8-MW19-SS2 BA-I 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CD-XF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 418.1 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	3-20-88
88081750 DANGB8-MW19-SS2 CD-XF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 CR-YF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-16-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 CR-VF 8-11-88 9-07-88 88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-X-F 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-X-F 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-X-F 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 PB-F 8-11-88 9-16-83 88081750 DANGB8-MW19-SS2 418.1 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-20-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 418.1 8-11-88 9-09-88 9-11-88 88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 MOIS 8-11-88 8-17-88 88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8020 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 8010 8-11-88 8-20-88 8 88081750 DANGB8-MW19-SS2 8020 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-YF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-IF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-IF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081750 DANGB8-MW19-SS2 8020 8-11-88 8-20-88 88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-IF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-IF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	8-20-88
88081750 DANGB8-MW19-SS2 8080 8-11-88 9-08-88 9-18-88 88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	8-20-88
88081751 DANGB8-MW19-SS3 BA-I 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081751 DANGB8-MW19-SS3 CD-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 CR-XF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081751 DANGB8-MW19-SS3 CR-LF 8-11-88 9-07-88 88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-16-88 88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081751 DANGB8-MW19-SS3 PB-F 8-11-88 9-09-88 9-11-88	
88081751 DANGB8-MW19-SS3 418.1 8-11-88 9-09-88 9-11-88	
88081751 DANGB8-MW19-SS3 MOIS 8-11-^8 8-17-88	
	8-20-88
	3-20-88
88081751 DANGB8-MW19-SS3 8080 8-11-88 9-08-88 9-18-88	, 20 00

If applicable

These "Is" were types.

CL-FRM01

88-A1-DULU0084 1

A SUBSIDIARY OF THE PARSONS CORPORATION

600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

Job No.:

OR001.00

Project:

Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8-11-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88081752	DANGB8-MW16-SS1	BA-I	8-11-88		9-07-88	
88081752	DANGB8-MW16-SS1	CD-XF	8-11-88		9-07-88	
88081752	DANGB8-MW16-SS1	CR-XF	8-11-88		9-07-88	
88081752	DANGB8-MW16-SS1	PB-F	8-11-88		9-16-88	
88081752	DANGB8-MW16-SS1	418.1	8-11-88	9-09-88	9-11-88	
88081752	DANGB8-MW16-SS1	MOIS	8-11-88		8-17-88	
88081752	DANGB8-MW16-SS1	8010	8-11-88		8-20-88	8-22-88
88081752	DANGB8-MW16-SS1	8020	8-11-88		8-20-88	8-22-88
8 <u>80</u> 81752	DANGB8-MW16-SS1	8080	8-11-88	9-08-88	9-18-88	
88081753	DANGB8-MW16-SS2	BA-I	8-11-88		9-07-88	
88081753	DANGB8-MW16-SS2	CD-XF	8-11-88		9-07-88	
88081753	DANGB8-MW16-SS2	CR-X F	8-11-88		9-07-88	
88081753	DANGB8-MW16-SS2	PB-F	8-11-88		9-16-88	
88081753	DANGB8-MW16-SS2	418.1	8-11-88	9-09-88	9-11-88	
88081753	DANGB8-MW16-SS2	MOIS	8-11-88		8-17-88	
88081753	DANGB8-MW16-SS2	8010	8-11-88		8-21-88	8-22-88
88081753	DANGB8-MW16-SS2	8020	8-11-88		8-21-88	8-22-88
88081753	DANGB8-MV16-SS2	8080	8-11-88	9-08-88	9-18-88	
88081754	DANGB8-MW16-SS6	BA-I	8-11-88		9-07-88	
88081754	DANGB8-MW16-SS6	CD-1 F	8-11-88		9 - 07-88	
88081754	DANGB8-MW16-SS6	CR-1/F	8-11-88		9-07-88	
88981754	DANGB8-MW16-SS6	PB-F	8-11-88		9-16-88	
88081754	DANGB8-MW16-SS6	418.1	8-11-88	9-09-88	9-11-88	
88081754	DANGB8-MW16-SS6	MOIS	8-11-88		8-17-88	
88081754	DANGB8-MW16-SS6	8010	8-11-88		8-21-88	8-21-88
88081754	DANGB8-MW16-SS6	8020	8-11-88		8-21-88	8-21-88
88081754	DANGB8-MW16-SS6	8080	8-11-88	9-08-88	9-18-88	

^{*} If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88081749-88081754
WORK ORDER NO.: 833

These soil samples were received at the ES Berkeley Laboratory on 8-11-88. They were received cold and intact.

ENGINEERING-SCIENCE INC. 09/28/88

PAGE 1

ANALYSIS REPORT

er order number:

833 - NUMBER : ZB0000000440

-K ORDER DATE : 08/11/88

APPROVED BY Lab Supervisor

ORT DATA:

OAK RIDGE/DULUTH ANGB 1 S. ILLINOIS AVE. STE. S103

RIDGE, TN 37830

L HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINDIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

TACT

: BILL HAYDEN

(6151-481-3920

5K: 2, UNITS: mg/kg

3T COMPOUND	DANGB8-MW19-SS1 8-10-88 88081749	DANGB8-MW19-552 8-10-88 88081750	DANGB8-MW19-SS3 8-10-88 38081751	DANGB8-MW16-SS1 8-10-88 88081752	DANGB8-MW16-SS2 8-10-88 89081753	DANGB8-MW16-S56 8-10-88 88081754
:D DIG SOIL	NA	NA	NA *	NH	NA	NA
RIUM	37.8	43,4	25.0	20.0	24.4	24.7
MIUM	9, 9* h	14.4*N	9.6*N	6.2*N	7.3*N	10.1*N
- OMIUM	37.8	43.4	25.0	20.0	24.4	21.5
40	7.75	4.45	6.45	10.65	8.15	4.79

ANALYSIS REPORT

UORK ORDER NUMBER: 833
B NUMBER : ZB000000440
CRK ORDER DATE : 08/11/88

APPROVED BY

PORT DATA: OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103 AK RIDGE, TN 37830

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

DNTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 3, UNITS: mg/KG

TEST COMPOUND	DANGB8-MW19-S51	DANGB8-MW19-SS2	DANGB8-MW19-SS3	DANGB8-MW16-SS1	DANGB8-MW16-SS2	DANGB8-MW16-SS6
	8-10-88	8-10-88	8-10-88	8-10-88	8-10-88	8-10-88
	88081749	88081750	880W1751	88081752	88081753	88081754
18.1 PETROLEUM HYDROCARBONS	<100	<100	<100	<100	<100	<100
% moisture	17.8	8.4	9.2	27.9	26.3	14.8

ANALYSIS REPORT

RK ORDER NUMBER: 833

3 NUMBER : ZB000000440

RK ORDER DATE : 08/11/88

APPROUED BY

Lab Cuanculana

'ORT DATA:

OAK RIDGE/DULUTH ANGB

) S. ILLINDIS AVE. STE, S103

RIDGE, TN 37830

L HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

71'S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ITRACT / PO # : OROO1

TACT

: BILL HAYDEN

(615)-481-3920

5K: 4, UNITS: ug/Kg, GROUP 8010

3T COMPOUND	DANGB8-MW19-SS1 8-10-88 88081749	DANGBB-MW19-SS2 8-10-88 88081750	DANGB8-MW19-SS3 8-10-88 88081751	DANGB8-MW16-SS1 8-10-88 88081752	DANGB8-MW16-SS2 8-10-88 88081753	DANGB8-MW16-SS6 8-10-88 88081754
YZYL CHLORIDE	ND	ND	ND	ND	ND	ND
3 (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND	ND
3 (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND	ND
)MOBENZENE	ND	ND	ND	ND	ND	ND
3MODICHLOROMETHANE	ND	ND	ND	NC	ND	ND
OMOFORM	ND	ND	ND	ND	ND	ND
OMOETHANE	ND	ND	ND	ND	ND	ND
RBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
_ORACETALDEHYDE	ND	ND	ND	ND	ND	ND
_ORAL	ND	ND	ND	ND	ND	ND
LOROBENZENE	NC	ND	ND	ND	ND	ND
OROETHANE	ND	ND	NO	ND	NO	ND
_OROFORM	9.58	0.058	0.048	ND	ND	ND
CHLOROHEXANE	ND	ND	ND	ND	ND	ND
CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
_OROMETHANE	ND	ND	ND	ND	ND	ND
LOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND	ND
LOROTOLUENE	ND	ND	ND	ND	ND	ND
3ROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
3RGMOMETHANE '	ND	ND	ND	ND	ND	ND
2-DICHLOROBENZENE	ND	ND	ND	HD	ND	ND
3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
 -DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
CHLORGDIFLUOROMETHANE	ND	HD	ND	ND	ND	ND
1-DICHLOROETHANE	NO	ND	ND	ND	ND	ND
2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
i-DICHLOROETHYLENE	NO	ND	ND	ND	ND	ND
ANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	10B	3.28	3.28	5.18	10B	4.1B
2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND

ENGINEEFING-SCIENCE INC. 09/28/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 833

EST COMPOUND	DANGB8-MW19-SS1 8-10-88 88081749	DANGB8-MW19-SS2 8-10-88 88081750	8-10-88	DANGB8-MW16-SS1 8-10-88 88081752	DANGE8-MW16-SS2 8-10-88 88081753	DANGB8-MW16-S56 8-10-88 88081754
3-DICHLOROPROPYLENE 1,1,2,2-TETRACHLOROETHANE 1,1,1,2-TETRACHLOROETHANE ETRACHLOROETHYLENE 1,1,1-TRICHLOROETHANE 1,1,2-TRICHLOROETHANE RICHLOROETHYLENE RICHLOROFLUOROMETHANE TRICHLOROPROPANE "INYL CHLORIDE	ND ND ND ND ND ND ND ND ND ND	NO ND ND NO ND ND ND ND ND ND ND ND	ND ND ND ND ND ND ND ND	ND ND ND ND ND ND ND ND	ND ND ND ND ND ND ND ND ND	ND ND ND ND ND ND ND ND

vennesember of

ANALYSIS REPORT

₹K ORDER NUMBER: 633

3 NUMBER : ZB0000000440 RK ORDER DATE : 08/11/88

APPROVED BY

PORT DATA:

OAK RIDGE/DULUTH ANGB

) S. ILLINOIS AVE. STE. S103

K RIDGE, TN 37830

L HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE, S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

MTRACT / PO # : 0R001

ITACT

: BILL HAYDEN

(615)-481-3920

5K: 4, UNITS: ug/Kg, GROUP 8020

3T COMPOUND	DANGB8-MW19-SS1 8-10-88 88081749	DANGB8-MW19-552 8-10-88 88081750	DANGB8-MW19-SS3 8-10-88 88081751	DANGBB-MW16-551 8-10-88 88081752	DANGB8-MW16-SS2 8-10-88 88081753	DANGB8-MW16-SS6 8-10-88 88081754
YZENE	ND	ND	КЭ	ND	ND	ND
LOROBENZENE	ND	ND	ND	ND	ND	ND
?-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND	NO	ND
HYL BENZENE	ND	ND	ND	ND	ND	ND
LUENE	10	1.7	4.4	15	41	7.5
_ENE\$	NO	NO	NO	ND	5.6	ND

CHAIN OF CUSTODY RECORD

PRINTED THE PRINTED TO THE PRINTED T

Consideration of the second co

Mille Schill and Care of the care of the same of the care of the c

Constitute at the constitution promotor party processing processin	EN	600 Bancroft Way Berkeley, CA. 54710	REMARKS		Sucolo is for Bring out		V V		1.		-				17			Date/Time Received by: (Signature)			
CUSTODY RECORD	SOILS ANALYSES REQUIRED				XXXX	*	* * * * *	\(\times \)	* * * *	· ×	٧ × ×	×	1 X X X.	×	メメメ			Relinquished by: (Signature)		Date/Time Remarks	
CHAIN OF CUS	PROJECT NAME/LOCATION Duluth ANGB/ Duluth, Mn. No.	Sucial Peter Personalisis CON-	SAMPLE DESCRIPTION TAINERS	1 1 1 28 - mmi 4 - 551	18 - Mulq - 55)	1 - mul4-557	1. ZSS-41-MM - 38	CANGER - AIW 19 - 553	PANC BB - MU 14 -555	DANGES - MW 16 - 551	2ANG 188 - AMVIG - 551	88-nw16-552	PANGES - MW16-552-	DANGISS - MW16 -556	DANGSS- MWIG - SSE	 I high I want	- Lange	re) Date/Time Received by: (Signature)	9.15 by 1620	(Signature)	
C. T. I.	ES JOB NO. PROJECT ORO01	SAMPLERISI: (Signatura)	DATE TIME	DONNY OISO SEAS	> 5.81 6810 PANGES -	8 3 2 1 C825 PANGES -	6 3783 CB2S, DANEBY	NHO LE 30 (8 11. 4	NYO (180 1881)	0454		3 754 1505 DANGES		4711	3-10-18 1124 DANG	1	755	Remaulahed by: (Signature)	month de-	Relinquished by: (Signature)	

999333066	trav	ant a Phana Mandar (May Important	Appartment/Floor No.	1	94710		AP Properte	Federal Express Use Base Charres	22	1.00	Ober 2	PART /2041/2800		
PACKAGE ALB B C	SENDER'S COPY	in the state of	a man or of the	Constitute of the Board of the States	A S	IF NOLD FOR PICK-UP, Print FEDEX Address Nove	and S	SERVICE CONDITIONS, DECLARED VALUE	151	responded to any claim on elected of 2000 pt. Per enaul of this, demange, charge or enaul of the claim of th	Service Guele apply Year replat to accove to the coast of the retrine value of the pechage, as is, recover, enterest profit, althorings best, coast, damage whether days, recidental consequents	The eff is no great that the present at the development were stated the eff is no great that the present of the	Sender authorises Federal Express to deliver this ship- ment willout obtaining a delivery signalure and shall inderwish and hold harmless Federal Express from any cleans sesuland therefore.	
		To (Recipients Name) Please Prin	Company .	Esset Street Address (No. 2000)	an here is			The sections of Section 1997.	Use of the surface of the surface of the country of	Market of the control	Total Federal Express Federal Express Federal Express Fry divisit term of	5.28 5.28 5.28 5.28	Δ	Release Squature
AIRBILL SEE THE ARREST CAN AND AND AND THE CRETITIENT WELL ALASEA AND AND AND AND AND AND AND AND AND AN		Your Phone Number (New Important)	Department/Floor No.		11 P Repaired 11	[FIRST 24 CHARACTERS WILL APPEAR ON INVOICE]	Bit 3rd Parry FeatEx Acst Ne. Bit Credit Card	I NANDLING PRESENTS	OR PICK-UP SAME 3.1		NCE SERVICE (CSS) TOM TOWN	Tr Received At Seon 1 C Regular Seon 2 C On Call Sup 3 C On Ca	FEDEX Carp. Emproyee No.	Date/Time for FEDEX Use
PRESENTATION OF SOUTH	8669231066 7 × 8 20-168	1.4-11	1 / 3 horasti-	Illinis A	A	~	ienti Feder Aces Na. 🔲 Bel 346 Pa	DELIYERY AND SPECIAL HANDLING	1 Director	3 DELIVER SATURDAY am ompt	S CHESTAIN SHIFTILLING SERVICE ESS	י מונו באוכחו בונושכו	O D CANADA MCA. UP	12 MOUBAT DELITERY & comment
	Series France Express Account Purify	From (Your Name) Phase Print	Company of the Company	Sheel Addressy	Oak Willio	YOUR BILLING REFERENCÉ INFORMATION	MANAGETT K. Den Sander Den Proch	SEAVICES	1 Semp towary to G DEFERENT	2 COUNTS.PAK 7 OF CHIEFLOPE	3 OVERNIENT 8	4 OPERMENT 9	S STANBARB 10	Poccare Dearman day
		0			Ad	00						8911	Ъ. Б	. ••,

QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS

Signatural services of the ser

teristickens.

Shamman and a

Job No.:	OR001	QC Report No:	TPH-S-0045-88	
		Sample Matrix:	Scil	
Client:	ES Oak Ridge	Conc. Unit:	mg/KG	
Attn:	Bill Hayden	Date Received:	8-11-88	
Address:	710 S. Illinois Avenue	Date Prepared:	9-09-88	
	Suite F-103.	Date Analyzed:	9-11-88	
	Oak Ridge, In. 37830	Date Reported:	9-21-88	
		Dilution Factor:	6.5	
		#Moisture:	17.8	
Project:	Duluth ANGB			
		Laboratory Supervisor Approval:	sor Approval:	
QC Report for	QC Report for Laboratory Sample No(s):	• (•	
•	88081749-88081754, 88081877-88081879	MANGER	the	
	88081883-88081890	S		
Laboratory	Anal			

Notes	
RPD	18
PR	83
MSD	876
PR	98
MS	1050
SA	1220
SR	<100
Blank	<100
Anal Method	418.1
Laboratory Sample No.	88081749

NOTE: If # moisture is reported, results are presented on a dry-weight basis.

MS = Spike Sample MSD = Spike Duplicate Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2}$ X 100

Percent Recovery (PR) = $SSR - SR \times 100$

SA

SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable NC = Not Calculated ND = Not Detected

1761

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

No. of the *

> VGC-S-0035-88 8-25-88 8-15-88 9-16-88 ug/KG Soil Dilution Factor: Sample Matrix: Date Received: Date Prepared: Date Reported: Date Analyzed: QC Report No: Conc. Unit: # Moisture: 710 S. Illinois Avenue Oak Ridge, Tn. ES Oak Ridge Suite F-103 Bill Hayden Duluth ANGB OR001 Job No.: Address: Project: Clie::: Attn:

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s).: 88081749-88081754, 88081877-88081879,

1769

	- 1
	- 1
	- 1
	1
	- 1
	1
	- 1
	- 1
	-
	-
	1
	1
	-
	ı
	1
	1
	-
	1
	1
	1
	i
	1
	1
	- 1
	1
	1
	-
	-
	1
	1
	-
	1
	1
	1
	1
	1
	-
	1
	1
	1
	1
$\overline{}$	1
$\tilde{\sim}$	-
χ.	1
≃	-
88031883-88081890	- 1
≍	1
8001883-880	1
₩	1
œΡ	1
	1
Ξ.	1
Φ.	-
ဃ	-
	1
9	ĺ
$\mathbf{\mathcal{L}}$	1
ထ	1
∞	-
	1
	-
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1
	1

Laboratory Sample No.	 Compound	SA	SR	MS	PR	MSD	l PR	RPD	ES RPD	QC Limits #Recovery	
	Halocarbons: 8010	nik kake sang		W-166 0-0					~ - -		
88081878	1.1-dichloroethane	11.2	QN -	14.4	129*	12.3	110	16	50	58-124	
	Trichloroethene	11.2	ON -	14.0	125*	12.1	108	15	16	75-110	
err galag kan	Chlorobenzene	11.2	ON -	12.7	113	10.8	16	91	121	71-125	
	Aromatics: 8020	****			Pho age 200		~~				
88081878	Bonzene	11.2	Q.	11.3	101	11.2	100		1 26	75-123	
	; Toluene	11.2	1.4	12.1	96 !	10.8	†8 !	11	16	79-115	
	Chlorobenzene	11.2	QN -	10.6	92	9.8	88	8	1 24	82-112	~-

Blank spike analysis shows the laboratory to be in control. NOTE: If % moisture is reported, results are presented on a dry-weight basis. Percent recoveries do not meet the ES QC limits.

x 100 (MS + MSD)/2 MS - MSD Relative Percent Difference (PR)

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate

SR = Sample Result SA = Spike Added (Concentration)

Not Applicable Not Calculated

Not Detected

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

A BOOK HOLD IN

Parameterson A.

Participation of the Control of the

Allignmentings.

and interpretations of a

Sample Matrix: QC Report No: **OR001** Job No.:

VGC-S-0035-88B

ug/KG Soil

Date Received:

Conc. Unit:

710 S. Illinois Avenue Bill Hayden Address: Attn:

ES Oak Ridge

Client:

37830 Suite F-103 Oak Ridge, Tn. Laboratory Supervisor Approval:

8-25-88 9-16-88

Dilution Factor: Date Reported:

Moisture:

Date Analyzed: Date Prepared:

QC Report for Laboratory Sample No(s):: 88081877-88081879

1763

Duluth ANGB

Project:

88081883-88081890

SM - SR - SS -									~~	 ES	QC Limits
- ::-	Compount	μ	SA	SR	MS	PR	MSD	- PR	RPD	RPD	#Recovery

Laboratory Sample No.	Compound	SA	SR	WS	l PR	MSD	PR	RPD	ES RPD	QC Limits Recovery
	Halocarbons: 8010		~~ ~				, www. was			
Blank	1,1-dichloroethane	10.0	QN	9.73	16	9.82	86		200	58-124
	Trichloroethene	10.0	2	9.82	86	10.1	101	m .	16	75-110
	Chlorobenzene	10.0	ON I	10.1	101	9.55	95	0	12	(1-12
	Aromatics: 8020						****		***	
i Blank	Benzene	10.0	QN	9*46	95	10.0	100	9	92	75-123
	Toluene	10.0	QN -	8.75	88	9 28	1 93	9	16	79-115
	Chlorobenzene	10.0	ND	10.2	102	9.89	86	<i>=</i>	- 2 1	82-112

NOTE: If # moisture is reported, results are presented on a dry-weight basis.

x 100 (MS + MSD) /2 MS - MSD ŧI Relative Percent Difference (PR)

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result - SR x 100 Percent Recovery (PR) = (MS or MSD)

SA = Spike Added (Concentration)

Not Calculated Detected Not NA = NC = ND =

Not Applicable

QC-FRM3S

Street Shipping and a second

•	•
0000	
7	
-	•
Q	
C	2
٠	4
,	
2	
7	į
1	•
7	
•	ì

Client: Attn:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, In. 37830 Address:

Duluth ANGB

Project:

Soil mg/KG 9-16-88 Sample Matrix: Conc. Unit: Date Reported:

Laboratory Supervisor Approval:

Inclusive Sample Nos.	88081749-88081752	88081753-88081754	
CRDL	0.25	0.25	
} Conc	5.9	0°6	
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane	
CAS Number	75-09-2 67-66-3	75-09-2	
Instru-	Carbopack 75-09-2 67-66-3	Carbopack 75-09-2	
Fraction	290	200	
Date Analyzed	8-20-88	8-21-88	
File ID	22	#E	1764

QUALITY CONTROL RESULTS SUMMARY

高級なることない とろいないこと

METALS

OR001 Job No. Client: Attn:

ES Oak Ridge Bill Hayden

"Address:

710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, In.

ICP-S-0023-88 8-08-88 9-20-88 mg/KG Soil NA Dilution Factor: Date Received: Date Reported: Sample Matrix: QC Report No: Conc. Unit: #Moisture:

Project:

Duluth ANGB

QC Report for Laboratory Sample No(s): 88081706, .88081708-88081709

88081749-88081754, 88081898-88081906

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Laboratory Sample Nos. Duplicates Spike	Date Anal	Date Prep	Anal Method	Blank	C1	Duplicate C2	RPD	SA	Spike E SR	Recovery	<u>æ</u>	lot.
Barium	88081706	88081706	9-07-88	8-23-88	SW6010	<20	49.9	49.0	2	228	49.9	228	7.8	< < <
Cadmium	88081706	88681706	9-07-88	8-23-88	SW6010	,<0.5	6.7	5.1	27#	5.70	6.7	9.3	46N	
Chromium	88081706	88081706	9-07-88	8-23-88	SW6010	<1.0	24.6	22.3	10	22.8	24.6	42.8	80	

765

If # moisture is reported, results are presented on a dry-weight basis. NOTE:

See Legend attached.

See Legend attached.

See Case Narrative attached.

C1 = Concentration One = Concentration Two 3X 100 (C1 + C2)/2 Relative Percent Difference (RPD)

Percent Recovery (PR) = SSR - SR x 100 SA

NA = Not Applicable NC = Not Calculated ND = Not Detected

SA = Spike Added (Concentration) SSR = Spiked Sample Result SR = Sample Result

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

Samples No.: 88081706, 88081708-88081709

Samples No.: 88081749-88081754 Samples No.: 88081898-88081906 QC REPORT NO.: ICP-S-0023-88

The results obtained for the laboratory control sample (LCS) analyzed with these samples for the analytes Cadmium, Chromium and Barium exceeded the recommended EPA recoveries. All data associated with this batch was closely inspected and no analytical problems were found. The initial and continuing calibration verification standards and blanks and precision and accuracy recoveries were within acceptable limits with the exception of Cadmium.

The Cadmium spike recovery below acceptable limits was followed by an analytical spike as required by laboratory standard operating procedure. The results of the analytical spike indicate matrix interference for this analyte.

SUMMARY	
RESULTS	
CONTROL	
QUALITY	

Stire Waterpa

Shaffed Antibus

ADDRESS SALES SALES

があるという

pelinelista uti-lida.

į

4 E 1

METALS

710 S. Illinois Avenue ES Oak Ridge Bill Hayden Suite F-103 **OR001** ... Job No.: Address: Client: Attn:

Oak Ridge, Tn.

Duluth ANGB

· · Project:

AAF-S-0022-88 9-20-88 8-19-88 mg/KG 12.2 501) Dilution Factor: Sample Matrix: Date Reported: Date Received: QC Report No: Conc. Unit: #Moisture:

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s): 88081708-88081709 88081749-88081754

5 Blank Method Anal Date Prep Date Anal Sample Nos. Spike Analyte Laboratory Duplicates

8-19-88 9-08-88

88081706

88081706

Lead

<0.5 7421

7.7

8.2

9

5.3

12.8 7.7

96

Notes

Spike Recovery

SR

RPD

Duplicate

If % moisture is reported, results are presented on a dry-weight basis.

. NOTE:

1767

= Concentration One = Concentration Two 5 8 X 100 c1 - c2(c1 + c2)/2 Relative Percent Difference (RPD)

NA = Not Applicable NC = Not Calculated ND = Not Detected

Percent Recovery (PR) = SSR - SR x 100

SSR = Spiked Sample Result

SR = Sample Result
SA = Spike Added (Concentration)

418.1 INITIAL & CONTINUING CALIBRATION DATA

Job No.:

OR001

Calibration Date:

9-11-88

Client:

ES Oak Ridge

Instrument I.D.:

Perkin Elmer 257

Attn:

Bill Hayden

710 S. Illinois Avenue

Unit:

mg/L

Grating Infrared Spectrophotometer

Address:

Suite F-103

Oak Ridge, Tn.

37830

Date Reported:

11-09-88 0.9998

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Laboratory Sample No(s).:

nursing

88081749-88081754 88081877-88081879 88081883-88081890.

Standard	Concentration	Absorbance	/Continuous RF /Calibration /Verification
No. 1	0.59	0.115	
No. 2	1.2	0.212	RF = 6.57
No. 3	1.8	0.301	
No. 4	2.4	0.391	
Cont. Cal. No. 2 (88081749-88081752)	1.20	0.210	100%
Cont. Cal. No. 2 (88081753-88081754) (88081877-88081879) (88081883-88081887)	1.20	0.215	100%
Cont. Cal. No. 2 (88081889-88081890)	1.26	0.219	105%
	*		
	-		

LATILE CONTINUING CALIBRA	ATTON CL	imov.		
I Name:			,	ş
The state of the s	of the continuous and office	Contra	act:	
Case No.:	SA	S No.:_	. v	
Case No.:	Calibra	tion Date	e(s):8/20/	188
TAB FILE ID: 15.16	Init. Ca	lib. Dat	ce(s):8/1 9	188 ,81
MPOUND	RRF	RRF50	%D	
enzyl chloride	0.08			
s (2-choroethoxy)				
Uthane	0.04		100.00	
is (2-chordisopropy)	بسيو			
her omobenzere	0.26	1.16	100.00	
romodichloromethane	1.21	1.16	3.95	
compform	J.68	3.35	8.99	
nomoform	1.45	1.17	18.10	
rbon tetrachlorade	U. 26	0.21	20.89	
nloroacetaldehyde	3.20	2.95	್ ೧.೮೩	
lorobenzene	1 127	e se	ERR	
loroethane	1.38 0.55	1.60	-17.57	
loroform	4.50	0.49	11.09	
Chorotexans	0.92	4.17	6.86	
Chloroethyl vinyl ether	0.04		2.55	
loromethane	0.34		100.00	
loromethyl methyl ether	0.17		-1.59	
,m_,& p_Chlorotoluenes _	3.99	סק ד	100.00	
Dromoch) cromethane	3.90	3.40	4.97 12.93	
bromomethane	2.78	2.16	27.56	
2_Dichlorobenzene3_Dichlorobenzene	2.48	2.42	2.35	
3_Dichlorobenzene	1.94	1.99	-2.83	
4_Dichlorobenzene	2.47	2.46	0.54	
chlorodifluormethane	0.54		100.00	
1_Dichloroethane	1.95	1.54	20.79	
<pre>4_Dichioroethane</pre>	2.33	2.23	4.22	
1_Dichloroethylene ans_1,2_dichloroethylene	2.44	2.10	13.79	
ans_1,2_dichloroethylene	1.51	1.50	0.53	
chloromethane	4.21	3.55	15.56	
Z_Dichicropropane	2.70	2.73	-1.05	
3_Dichloropropylene	4.60	3,65	20.68	
1,2,2_letrachloroethane	6.65	7.25	-9.02	
1,1,2_Tetrachioroethane_	3.61	2.72	24.76	
trachloroethy)ene 1,1_Trich)oroethane	6.65	7.25	-9.02	
1,1_Trich orosthane	2.20	2.05	6.68	
7,2_!richloroethane	4.60	3.65	20.65	
ichloroethylene ichlorofluormathane	4.40	3.98	9.50	
ioniorotiuormethane	2.19		7.14	T.
achilorum opane	3.59	3:46		176
eyl chiceria.	1.08	A 05 .	15" 111	i / (1)

TILE CONTINUING CALIBR	ATION CH	IECK		
Name: ENGINEERING SCIENCE				
Code: Case No.:_	SAS	No.:	SDG No	*
trument ID.:CARBOPAK Cal	ibration [)ate(s):8	/ga/88	
FILE ID: RRF 5015			Inil cali	16 = 8/49/88
1POUND	RRF	RRF50	%D	
ızene	3.10	2.79	-10.14	
loroberzere		4.93		
<pre>d_Dichlerobenzene</pre>		2.83	15.93	
3_Dichlorobenzene		3.17	17.03	
1_Dichorphenzens	2.53	3.00	18.58	
yl Benzere	3.51	2.79	-20.63	
uene		3.47	-21.10	
/ meada =		D) 4.1	1000	

LATILE CONTINUING CALIBRA	,		• ,	
Name:	1	Contra	act:	
b Code: Case No.:	SAS	No.:_		• •
b Code: Case No.:	Calibrat	ion Date	e(s):8/21/	189
TAB FILE ID: 31,32	Init. Cal:	ib. Dat	e(s):8/19	188, 8/15/80
economics of	,	,		
MPOUND COUNTY	RRF	RRF50	%D	
enzyl chloride	0.08	0.17	-111.57	
(2-choroethoxy)				
thane	0.04		100.00	
is (2-choroisopropy)				
jer jomobsnzene	0.26		100.00	
[omobenzene			8.38	
romodichloromethane	3.68		7.36	
momoform			22.94 15.03	
omomethane	3.20		. 2.81	
hloroacetaldehyde	الماحض والمنا	Q. 11	ERR	
[lorobenzene	1 34	1 42	-4.47	
loroethane			36.02	
hloroform	4.50		4.20	
Chorohexalle	0.92		7.10	
Chloroethyl vinyl ether_	0.04		100.00	
nloromethane	0.34	0.39		
hloromethyl methyl ether_	A 17		4 (5)(5) (5)(5)	
[],m_,& p_Chlorotoluenes _	3.99	3.51	12.09	
			9.20	
·.bromomethane	2.98		18.78	
∏2_Dichlorobenzene	2.48		3.86	
3_Dichlorobenzene	1.94	2.04	-4.98	
,4_Dichlorobenzene	2.47	2.28	7.75	
#chlorodifluormethane	0.54		100.00	
1_Dichloroethane 2_Dichloroethane	1.95	1.88	3.45	
1,2_Dichloroethane	2.33	2.21	5.04	
I Dichloroethvlene	2.44	1.87	23.18	
ans_1,2_dichloroethylene chloromethane	1.51	1.63	-7.79	
Lichloromethane	4.21	3.81	9.52	
,2_Dichloropropane	2.70	2.73	-1.01	
3_Dichloropropylene	4.60	3.63	21.17	
1,2,2_Tetrachloroethane_	6.65	6.75	-1.54	
1.1.2 Tetrachloroethane	3.61	2.89		
etrachloroethylene 1,1_Trichloroethane 1,2_Trichloroethane	6.65	6.75	-1.50	
[1,1_Trichloroethane	2.20	2.12	3.43	
*,1,2_Trichloroethane	4.60	3.63	a a	
Frichloroethylene	4.40	3.54	19.52	
ichlorofluormethane	2.19	1.86	14.94	
Linchloropropane	3.59	2.69	25.04	1771
'inyl chlorade	1.08	୦.୫୦ "	26.28	1 ()

TILE CONTINUING CA	LIBRATION CH	ECK	,	
lame:ENGINEERING SCI	ENCE	Contra	act:	
Code: Case N	lo.: SAŞ	No.:	SDG No).:
rument ID.:CARBOPAR		_		
FILE ID: RRF 50	830		Inil Date	= 8/19/89
	The second of 1980 1990 days from the common page of the common second to the common second t			
TPOUND	RRF	RRF50	%D	
12 603	3.10	2.78	-10.24	
.orobenzena	5.31	5.09		
<pre>!_Drchlorobenzene</pre>	2.44	2.65	8.70	
3_Dichlorobenzene	2.71	3.00	10.70	
- Dichorchennene		2.78	9,98	
nyl Bentene		3.13	-10.81	
tuene		3.57	2.74	
enes	7.63	8.13	6.56	

DATA PACKAGE #28 This page intentionally left blank.

Job No.:

ORO 01

Client:

ES Oak Ridge

Attention:

Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 9-27-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092731	DANGB-BG-SL3-SD1	AS-F	9-24-88		10-16-88	······································
88092731	DANGB-BG-SL3-SD1	BA-I	9-24-88		10-17-88	
[£] 88092731	DANGB-BG-SL3-SD1	CD-F	9-24-88		10-18-88	
88092731	DANGB-BG-SL3-SD1	CR-F	9-24-88		10-18-88	
88092731	DANGB-BG-SL3-SD1	HG~C	9-24-88		10-17-88	
88092731	DANGB-BG-SL3-SD1	PB-F	9-24-88		10-16-88	
88092731	DANGB-BG-SL3-SD1	418.1	9-24-88	10-13-88	10-22-88	
1 ⁸⁸⁰⁹²⁷³¹	DANGB-BG-SL3-SD1	MOIS	9-24-88		10-10-88	
88092731	DANGB-BG-SL3-SD1	8010	9-24-88		10-05-88	10-04-88
88092731	DANGB-BG-SL3-SD1	8020	9-24-88		10-05-88	
-88092731	DANGB-BG-SL3-SD1	8080	9-24-88	10-07-88	10-25-88	
88092731	DANGB-BG-SL3-SD1	8270	9-24-88	10-07-88	11-15-88	

* If applicable

A CONTRACT OF THE PROPERTY AND A



Job No.:

ORO01

Project:

Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
38092732	DANGB-BG-SL2-SD1	AS-F	9-24-88		10-17-88	
3 8092732	DANGB-BG-SL2-SD1	BA-I	9-24-88		10-17-88	
3 8092732	DANGB-BG-SL2-SD1	CD-F	9-24-88		10-18-88	
38092732	DANGB-BG-SL2-SD1	CR-F	9-24-88		10-18-88	
38092732	DANGB-BG-SL2-SD1	HG-C	· ·24-88		10-17-88	
38092732	DANGB-BG-SL2-SD1	PB-F	9-24-88		10-16-88	
3 8092732	DANGB-BG-SL2-SD1	418.1	9-24-88	10-13-88	10-22-88	
38092732	DANGB-BG-SL2-SD1	MOIS	9-24-88		10-10-88	
88092732	DANGB-BG-SL2-SD1	8010	9-24-88		10-05-88	10-04-88
38092732	DANGB-BG-SL2-SD1	8020	9-24-88		10-05-88	
3 8092732	DANGB-BG-SL2-SD1	8080	9-24-88	10-07-88	10-25-88	
38092732	DANGB-BG-SL2-SD1	8270	9-24-88	10-07-88	11-30-88	
88092733	DANGB-BG-SL1-SD1	AS-F	9-24-88		10 - 17-88	
38092733	DANGB-BG-SL1-SD1	BA-I	9-24-88		10-17-88	
38092733	DANGB-BG-SL1-SD1	CD-F	9-24-88		10-18-88	
88092733	DANGB-BG-SL1-SD1	CR-F	9-24-88		10-18-88	
88092733	DANGB-BG-SL1-SD1	HG-C	9-24-88		10-17-88	
38092733	DANGB-BG-SL1-SD1	PB-F	9-24-88		10-25-88	
38092733	DANGB-BG-SL1-SD1	418.1	9-24-88	10-13-88	10-22-88	
88092733	DANGB-BG-SL1-SD1	MOIS	9-24-88		10-10-88	
88092733	DANGB-BG-SL1-SD1	8010	9-24-88		10-05-88	10-04-88
88092733	DANGB-BG-SL1-SD1	8020	9-24-88		10-05-88	
38092733	DANGB-BG-SL1-SD1	8080	9-24-88	10-07-88	10-25-88	
88092733	DANGB-BG-SL1-SD1	8270	9-24-88	10-07-88	11-15-88	

^{*} If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S):: 88092731-88092733
WORK ORDER NO.: 1048

These soil samples were received at the ES Berkeley Laboratory on 9-27-88. They were received cold and intact.

ENGINEERING-SCIENCE INC. 12/27/88

PAGE 1

ANALYSIS REPORT

ORK ORDER NUMBER: 1048

38 NUMBER : ZB0000000440

RK ORDER DATE : 09/27/88

APPROVED BY

Lab Supervisor

.PORT DATA:

3 OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. \$103

AK RIDGE, TN 37830

LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : ORO01

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 2, UNITS: MG/KG

EST COMPOUND	DANGB-BG-SL3- SD1 88092731	DANGB-BG-SL2- SD1 88092732	DANGS-BG-SL1- SD1 88092733
CID DIG SOIL	NA	NA	NA
RSENIC	<1.2	<1.5	<1.2
ARIUM	36.3	46.4	31.4
ADMIUM	<0.6	<0.75	<0.61
HROMIUM	11.2 N	15.5 N	12.9 N
ERCURY	<0.12	6.3	<0.12
CAE	4.0	<0.15	4.8 S

ENGINEERING-SCIENCE INC. 12/27/88

PAGE 2

ANALYSIS REPORT

RK ORDER NUMBER: 1048

JOB NUMBER : ZB000G000440

WORK ORDER DATE : 09/27/88

Lab Supervisor

EPORT DATA:

ES OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

AK RIDGE, TN 37830

FOILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 3, UNITS: mg/Kg

TEST COMPOUND	DANGB-BG-SL3- SD1 88092731	DANGB-BG-SL2- SD1 88092732	DANGB-BG-SL1- SD1 88092733
18.1 PETROLEUM HYDROCARBONS	<100	170	<100
A MOISTURE	18.3	33.5	16.9

ANALYSIS REPORT

ORK ORDER NUMBER: 1048

)B NUMBER : 280000000440

RK ORDER DATE : 09/27/88

APPROVED BY

ab Supervisor

'PORT DATA:

3 OAK RIDGE/DULUTH ANGB

O S. ILLINOIS AVE. STE. S103

K RIDGE, TN 37830

LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

SK: 4, UNITS: ug/Kg, GROUP 8010

ST COMPOUND	DANGB-BG-SL3- SD1 88092731	SD1 88092732	SD1 88092733
NZYL CHLORIDE	ND	ND	ND
S (2-CHLOROETHOXY)METHANE	ND	ND	ND
S (2-CHLOROISOPROPYL)ETHER	ND	ND	ND
OMOBENZENE	ND	ND	ND
OMODICHLOROMETHANE	ND	ND	ND
OMOFORM	ND	ND	ND
OMOETHANE	ND	ND	ND
RBON TETRACHLORIDE	ND	ND	ND
LORACETALDEHYDE	ND	ND	ND
1LORAL	ND	ND	ND
LOROBENZENE	ND	ND	ND
LOROETHANE	ND	ND	ND
LOROFORM	ND	CM	ND
CHLOROHEXANE	ND	ND	ND
CHLOROETHYL VINYL ETHER	ND	ND	ND
LOROMETHANE	ND	ND	ND
LOROMETHYL METHYL ETHER	ND	ND	ND
LOROTOLUENE	ND	ND	ND
BROMOCHLOROMETHANE	ND	ND	ND
BROMOMETHANE	ND	ND	ND
2-DICHLOROBENZENE	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND
CHLOROD I FLUOROMETHANE	ND	ND	ND
1-DICHLOROETHANE	ND	ND	ND
2-DICHLOROETHANE	ND	ND	ND
1-DICHLOROETHYLENF	ND	ND	ND
ANS-1,2-DICHLOROETHYLENE	ND	ND	ND
CHLOROMETHANE	0.77B	69B	348
2-DICHLOROPROPANE	ND	ND	ND

⁻ Not Detected

経過を取りていないな かかしゃしゃしゃ あるまる マナ・モ

ANALYSIS REPORT FOR WORK ORDER NUMBER 1048

DANGB-BG-SL3- DANGB-BG-SL2- DA SD1 SD1 SD TEST COMPOUND 88092731 88092732 88	8092733
,,3-DICHLOROPROPYLENE ND ND ND	D
1,1,2,2-TETRACHLOROETHANE ND ND ND	0
§ 1,1,1,2-TETRACHLOROETHANE ND ND ND	D
ETRACHLOROETHYLENE ND ND ND	D
र्वे १,1,1-TRICHLOROETHANE ND ND ND	D
1,1,2-TRICHLOROETHANE ND ND ND	D
RICHLOROETHYLENE ND ND ND	D
RICHLOROFLUOROMETHANE ND ND ND	D
TRICHLOROPROPANE ND ND ND	D
VINYL CHLORIDE ND ND ND	D

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/27/88

PAGE 5

ANALYSIS REPORT

RK ORDER NUMBER: 1048

38 NUMBER : 280000000440

RK ORDER DATE : 09/27/88

APPROVED BY

Lab Supervisor

PORT DATA:

3 OAK RIDGE/DULUTH ANGB

O S. ILLINOIS AVE. STE. S103

K RIDGE, TN 37830

'LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

\SK: 4, UNITS: ug/Kg, GROUP 8020

.ST COMPOUND	DANGB-BG-SL3- SD1 88092731	DANGB-BG-SL2- SD1 88092732	DANGB-BG-SL1- SD1 88092733
NZENE	ND	ND	ND
ILOROBENZENE	ND	ND	ND
2-DICHLOROBENZENE	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND
THYL BENZENE	ND	ND	ND
OLUENE	ND	ND	ND
'LENES	ND	ND	ND

PAGE 6

ANALYSIS REPORT

FORK ORDER NUMBER: 1048
EDOB NUMBER: 280000000440

WORK ORDER DATE : 09/27/88

APPROVED BY

EPORT DATA:

710 S. ILLINOIS AVE. STE. S103

MAK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : ORUGI

CONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/kg, GROUP 8080

L-section of the section of the sect	DANGB-BG-SL3- SD1	DANGB-BG-SL2.	DANGB-BG-SL1- SD1
TEST COMPOUND	88092731	83092732	88092733
LORIN	ND	ND	ND
EDRIN LPHA-BHC	ND	ND	ND
BETA-BHC	ND	ND	ND
" DELTA-BHC	ND	ND	ND
AMMA-BHC HLORDANE	ND	ND	ND
HLORDANE	ND	ND	ND
4,41-DDD	ND	ND	ND
₫',4'-DDE	ND	ND	ND
4'-DDE 4'-DDT	ND	ND	ND
ELDRIN .	ND	ND	ND
ENDOSULFAN I	ND	ND	ND
NDOSULFAN II NDOSULFAN SULFATE	ND	ND	ND
MDOSULFAN SULFATE	ND	ND	ND
[*] ENDRIN	ND	ND	ND
_ENDRIN ALDEHYDE	NA	NA	NA
EPTACHLOR EPOXIDE	ND	ND	ND
EPTACHLOR EPOXIDE	ND	ND	ND
KEPONE	NA	NA	NA
ETHOXYCHLOR	ND	ND	ND
METHOXYCHLOR OXAPHENE CCB-1016	ND	ND	ND
² cCB-1016	ND	ND	ND
PCB-1221	ND	ND	ND
養^CB-1232	ND	ND	ND
TOTAL CB-1232 CB-1242	ND	ND	ND
[™] PCB-1248	ND	ND	ND
PCB-1254	ND	ND	ND
CB-1260	ND	ND	ND

ND - Not Detected

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals 5 SW 8270 Matrix: Soil

ate Received:

September 26, 1988 December 9, 1988 Work Order: 1048 Job Number: OR001

•

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

idress:

ж:

710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88092731	88092732
ample No.:	DANGE-BG-SL3-SD1	DANGB-BG-SL2-SD1
ate Sampled:	09-24-88	09-24-88
ime Sampled:	14:05	10:45
ate Extracted:	10-07-88	10-07-88
ste Analyzed:	11-15-88	11-30-88
ercent Moisture:	18	34

umpound	Detection Limits		AL RESULTS veight)		
	ug/kg	ug/kg	ug/kg		
,3-Dichlorobenzene	330	ND	N D		
,4-Dichlorobenzene	330	ND	ND		
exachloroethane	330	ND	ND		
is(2-chloroethyl)ether	330	ND	ND		
,2-Dichlorobenzene	330	ND	ND		
-Nitrosodimethylamine	330	ND	ND		
is(2-chloroisopropyl)ethe	r 330	ND	ND		
-Witrosodi-n-propylamine	330	ND	ND		
exachlorobutadiene	330	ND	ND		
,2,4-Trichlorobenzene	330	ND	ND		
itropenzene	330	ND	ND		
cophorone	330	ND	ND		
aphthalene	330	ND	ND		
13(2-chloroethoxy)methane	330	ND	ND		
-Chloronaphthalene	330	ND	ND		
exachlorocyclopentadiene	330	ND	ND		
cenaphthylene	330	ND	ND		
senaphthene	330	ND	ND		
imethyl phthalate	330	ND	ND		
,6-Dinitrotoluene	330	ND	ND		
Luorene	330	ND	ND		
,4-Dinitrotoluene	330	ND	ND		
iethyl phthalate	330	ND	ND		
-Nitrosodiphenylamine	330	ND	ND		
exachlorobenzene	330	ND	ND		

⁼ Compound was detected in the plank,

Priority Pollutant Analysis Base Neutrals - 5W 8270 Matrix: Soil (continued)

Sate Received: September 26, 1988
Sate Reported: December 9, 1988 Work Order: 1048 Job Number: OR001

COR: ES:Oak Ridge/Duluth ANGB ddress: 710 S. Illinois Ave, Suite F-103 ATTN: Mr. Bill Hayden

Oak Ridge, TN 37830

lab Number: ample No.:	88092731	88092732
Lample No.:	DANGB-BG-SL3-SD1	DANGB-BG-SL2-SD1
Date Sampled:	09-24-88	09-24-88
ime Sampled: Extracted:	14:05	10:45
ate Extracted:	10-07-88	10-07-88
Date Analyzed:	11-15-88	11-30-88
¿Percent Moisture:	18	34

dompound 1	Detection Limits		AL RESULTS weight)	
4	ug/kg	ug/kg	ug/kg	
Phenanthrene	330	ND	790	
nthracene	330	ND	ND	
ibutyl phthalate	330	ND	ND	
'fluoranthene	330	ND	890	
4-Chlorophenyl phenyl ether	330	ND	ND	
yrene	330	ND	590	
Lutyl Benzyl phthalate	330	ND	ND	
Bis(2-ethylhexyl) phthalate	330	ND	ND	
hrysene	330	ND	420	
-Bromophenyl phenyl ether	330	ND	ND	
Benzo(a)anthracene	330	ND	ND	
Pi-n-octylphthalate	330	ND	ND	
enzo(b)fluoranthene	330	ND	ND	
senzo(k)fluoranthene	330	ND	ND	
Benzidine	2000	ND	ND	
,3'-Dichlorobenzidine	660	ND	ND	
Lenzo(a)pyrene	330	ND	ND	
Indeno(1,2,3-cd)pyrene	330	ND	ND	
;ibenzo(a,h)anthracene	330	ND	ND	
enzo(ghi)perylene	330	ND	ND	
Benzyl Alcohol	660	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: September 26, 1988 ate Reported: December 9, 1988

Work Order: 1048 Job Number: OR001

or: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88092731	88092732
ample No.:	DANGB-BG-SL3-SD1	DANGB-BG-SL2-SD1
ate Sampled:	09-24-88	09-24-88
ime Sampled:	14:05	1.0:45
ate Extracted:	10-07-88	10-07-88
ate Analyzed:	11-15-88	11-30-88
ercent Moisture:	18	34

ompound	Detection Limits	_	al Results weight)
	ug/kg	ug/kg	ug/kg
cetophenone	*	ND	ND
niline	*	ND	ND
-Aminobiphenyl	*	ND	ND
-Chloroaniline	660	ND	ND
-Chloronaphthalene	*	ND	ND
ibenzofuran	330	ND	ND
-Dimethylaminoazobenzene	*	ND	ND
,12-Dimethylbenz(a)anthra	acene*	ND	ND
-,a-Dimethylphenethylamin		ND	ND
iphenylamine	*	ND	ND
,2-Diphenylhydrazine	*	ND	ND
thyl methanesulfonate	~~*	ND	ND
-Methylcholanthrene	*	ND	ND
etnyi methanesulfonate	*	ND	ND
-Methylnaphthalene	330	ND	ND
-Naphthylamine	~~*	ND	ND
-Naphthylamine	*	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroso-di-n-butylamine	*	ND	ND
-Nitrosopiperidine	~ - ★	ND	ND
entachlorobenzene	~-×	ND	ND
entachloronitrobenzene		ND	ND
nenacetin	*	ND	ND
-Picoline	~-*	ND	ND
ronamide	*	ND	ND
,2,4,5-Tetrachlorobenzen	e∗	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank,

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: September 26, 1988
Pate Reported: December 9, 1988 Work Order: 1048 Job Number: OR001

ATTN: Mr. Bill Hayden

FOR: ES:Oak Ridge/Duluth ANGB Address: 710 S. Illinois Ave. Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092731	88092732
pample No.:	DANGB-BG-SL3-SD1	DANGB-BG-SL2-SD1
lbate Sampled:	09-24-88	09-24-88
Time Sampled:	14:05	10:45
pate Extracted:	10-07-88	10-07-88
pate Extracted:	11-15-88	11-30-88
Percent Moisture:	18	34

Compound	Detection Limits	(dr	· CICAL RESULTS Cy weight)
Trees of	ug/kg	ug/kg	ug/kg
Alpha-BHC	*	ND	ND
Gamma-BHC	*	ND	ND
Beta-BHC	660	ND	ND
leptachlor	330	ND	ND
Delta-BHC	500	ND	ND
Aldrin	330	ND	ND
ieptachlor epoxide	330	ND	ND
Indosulfan I	*	ND	ND
Dieldrin	500	ND	ND
: , 4' - DDE	1000	ND	ND
Indrin	*	ND	ND
Endosulfan II	*	ND	ND
, α, 4'-DDD	500	ND	ND
.,4'-DDT	830	ND	ND
indosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
Indrin Ketone	*	ND	ND
hlordane	2000	ND	ND
Methoxycnlor	~-*	ND	ND
[Toxaphene	2000	ND	ND
irocior-1016	2000	ND	ND
`Aroclor-1221	2000	ND	ND
,Aroclor-1232	2000	ND	ND
roclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND
Aroclor-1254	2000	ND	ND
roclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

ate Received: September 26, 1988 ate Reported: December 9, 1988

Work Order: 1048
Job Number: OR001

DR: ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

dress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88092731	88092732
ample No.:	DANGB-BG-SL3-SD1	DANGB-BG-SL2-SD1
ate Sampled:	09-24-88	09-24-88
ime Sampled:	14:05	10:45
ate Extracted:	10-07-88	10-07-88
ate Analyzed:	11-15-88	11-30-88
ercent Moisture:	18	34

mpound	Detection Limits		L RESULTS eight)
	ug/kg	ug/kg	ug/kg
-Chiorophenol	330	ND	ND
-Nitrophenol	330	ND	ND
henol	330	ND	ND
,4-Dimethylphenol	330	ND	ND
,4-Dichlorophenol	330	ND	ND
,4,6-Trichlorophenol	330	ND	ND
-Chloro-3-methylphenol	660	ND	ND
,4-Dinitrophenol	1600	ND	ND
, 6-Dichlorophenol	*	ND	ND
-Methyl-4,6-Dinitrophenol	1600	ND	ND
untachloropnenol	1600	ND	ND
-Nitrophenol	1600	ND	ND
enzoic Acid	1600	ND	ND
-Metnylphenol	330	ND	ND
- & 4-Methylphenol	330	ND	ND
,3,4,6-Tetrachlorophenol	X	ND	ND
,4,5-Trichlorophenol	330	ND	ND

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

OTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Reported: September 26, 1988
Date Reported: December 9, 1988

Work Order: 1048
Job Number: OR001

FOD. PS.O. Pide

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 Lab Number:
 88092733

 Dample No.:
 DANGB-BG-SL1-SD1

 Date Sampled:
 09-24-88

 Time Sampled:
 09:15

 Date Extracted:
 10-07-88

 Date Analyzed:
 11-15-88

 Percent Moisture:
 17

ompound	Detection Limit ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
,,3-Dichlorobenzene	330	ND	
1,4-Dichlorobenzene	330	ND	
Hexachloroethane	330	ND	
sis(2-chloroethyl)ether	330	ND	
_,2-Dichlorobenzene	330	ND	
N-Nitrosodimethylamine	330	ND	
3is(2-chloroisopropyl)ethe	r 330	ND	
Nitrosodi-n-propylamine	330	ND	
Hexachlorobutadiene	330	ND	
2,2,4-Trichlorobenzene	330	N D	
litrobenzene	330	ND	
isophorone	330	ND	
Naphthalene	330	ND	
is(2-chloroethoxy)methane	330	ND	
2-Chloronaphthalene	330	ND	
Hexachlorocyclopentadiene	330	ND	
(Acenaphthylene	330	ND	
acenaphthene	330	ND	
Dimethyl phthalate	330	ND	
2,6-Dinitrotoluene	330	ND	
luorene	330	ND	
2,4-Dinitrotoluene	330	ND	
Diethyl phthalate	330	ND	
-Nitrosodiphenylamine	330	ND	
jexachlorobenzene	330	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: September 26, 1988 ate Reported: December 9, 1988

Work Order: 1048 Job Number: OR001

ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

idress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

88092733 ab Number: DANGB-BG-SL1-SD1 ample No.: ate Sampled: 09-24-88 ime Sampled: 09:15 10-07-88 ate Extracted: ! ate Analyzed: 11-15-88 ercent Moisture:

ompound	Detection Limit ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
nenanthrene	330	ND	
athracene	330	ND	
ibutyl phthalate	330	ND	
luoranthene	330	ND	
-Chlorophenyl phenyl ethe	r 330	D	
yrene	330	ND	
ityl Benzyl phthalate	330	ND	
is(2-ethylhexyl)phthalate	330	770	
nrysene	330	ND	
-Bromophenyl phenyl ether	330	ND	
enzo(a)anthracene	330	ND	
1-n-octylphthalate	330	ND	
enzo(b)fluoranthene	330	ND	
enzo(k)fluoranthene	330	ND	
enzidine	2000	ND	
,3'-Dichlorobenzidine	660	ND	
enzo(a)pyrene	330	ND	
ndeno(1,2,3-cd)pyrene	330	ND	
ibenzo(a,h)anthracene	330	ИD	
enzo(ghi)perylene	330	ND	
enzyl Alcohol	66 V	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: mate Reported:

September 26, 1988 December 9, 1988

Work Order: 1048 Job Number: OR001

ATTN: Mr. Bill Hayden

LS:Oak Ridge/Duluth ANGB
Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

Lab Number:

88092733

Pample No.:

DANGB-BG-SL1-SD1

Date Sampled:

09-24-88

Time Sampled: apate Extracted: pate Analyzed:

09:15 10-07-88 11-15-88

Percent Moisture:

17

Compound	Detection Limits ug/kg	Analytical Results (dry weight) ug/kg	
[}			
cetophenone	*	ND	
Aniline	*	ND	
4-Aminobiphenyl	~-*	ND	
-Chloroaniline	660	ND	
'i-Chloronaphthalene	*	ND	
Dibenzofuran	330	ND	
-Dimethylaminoazobenzene	*	ND	
1:,12-Dimethylbenz(a)anthra	cene*	ND	
a-,a-Dimethylphenethylamin	.e*	ND	
Diphenylamine	 ∗	ND	
.,2-Diphenylhydrazine	~-*	ND	
Ethyl methanesulfonate	*	ND	
, 3-Méthylcholanthrene	*	ND	
lethyl methanesulfonate	*	ND	
12-Methylnaphthalene	330	ND	
1-Naphthylamine	 ∗	ND	
-Naphthylamine	×	ND	
:-Nitroaniline	1600	ND	
3-Nitroaniline	1600	ND	
-Nitroaniline	1600	ND	
-Nitroso-di-n-putylamine	—— £	ND	
N-Nitrosopiperidine	~-*	ND	
, Pentachlorobenzene	 *	ND	
entachloronitrobenzene	*	ND	
Thenacetin	*	ND	
2-Picoline	*	ND	
Pronamide	*	ND	
1,2,4,5-Tetrachlorobenzene	x	ND	

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

até Received: September 26, 1988 Work Order: 1048 até Réported: Décember 9, 1988 Job Number: OR001

DR: ES: Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88092733
ample No.:	DANGB-BG-SL1-SD1
ate Sampled:	09-24-88
<pre>ime Sampled:</pre>	09:15
ate Extracted:	10-07-88
ate Analyzed:	11-15-88
ercent Moisture:	17

ompound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
lpha-BHC	*	ND	
amma-BHC	 *	ND	
eta-BHC	660	ND	
eptachlor	330	ND	
elta-BHC	500	ND	
ldrin	330	ND	
eptachlor epoxide	330	ND	
ndosulfan I	*	ND	
ieldrin	500	ND	
,4'-DDE	1000	ND	
ndrin	~~*	ND	
ndosulfan (1	 *	ND	
,4'-DDD	500	ND	
,4'-DDT	830	ND	
ndosulfan Sulfate	1000	ND	
ndrin aldehyde	*	ND	
adrin Ketone	*	ND	
nlordane	2000	ND	
ethoxychlor	 ★	ND	
oxaphene	2000	ND	
coclor-1016.	2000	ND	
roclor-1221	2000	ND	
roclor-1232	2000	ND	
roclor-1242	2000	ND	
roclor-1248	2000	ND	
roclor-1254	2000	ND	
roclor-1260	2000	ND	

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: September 26, 1988 ate Reported: December 9, 1988

Work Order: 1048 Job Number: OR001

FOR:

ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

hab Number: 88092733

DANGB-BG-SL1-SD1

bample No.: Date Sampled:

09-24-88

Time Sampled: Date Extracted:

09:15 10-07-88

Date Analyzed:

11-15-88

17 .

percent Moisture:

	etection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
2-Chlorophenol	330	ND	
;-Nitrophenol	330	ND	
henol	330	ND	
2,4-Dimethylphenol	330	ND	
13,4-Dichlorophenol	330	ND	
1,4,6-Trichlorophenol	330	ND	
'4-Chloro-3-methylphenol	660	ND	
2,4-Dinitrophenol	1600	ND	
:,6-Dichlorophenol	*	ND	
-Methyl-4,6-Dinitrophenol	1600	ND	
Fentachlorophenol	1600	ND	
-Kitrophenol	1600	ND	
senzoic Acid	1600	ND	
2-Methylphenol	330	ND	
3- & 4-Methylphenol	330	ND	
3,4,6-Tetrachlorophenol	*	ND	
2,4,5-Trichlorophenol	330	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

CHAIN OF CUSTODY RECORD

	S SHIP TO ENGING-SCIE		REMARKS	88073 Kirms	862731 DN 989732.	. 889739	989733		882732 +82733 DN							Date/Time Received by; (Signature)		·		Mark Comments
OF CUSTODY RECORD	SOILS ANALYSES NO. REQUIRED	, ,	TAINERS (00 00 00 00 00 00 00 00 00 00 00 00 00	×	X	X X X X X X	XXXX	<i>X</i>								ure) Relinquished by: (Signature)		Laboratory by: Date/Time Remarks	13. d.g.	
CHAIN OF	PROJECT NAME/LOCATION Dufuth ANGB/Duluth, Mn.	Mourin Bio Birly	SAMPLE DESCRIPTION	DANIGB - 66-51 3-501	14:05 DAMIGIZ. RG-SUZ-CDI	-215-	9-15 DANAS 5-86-50	DANIS 12 - 0 - 67 - 50 1	12 - 2 - C - C - C - C - C - C - C - C -							(Signature) Date/Time Received by: (Signatur	Ulum 9/24 1630	(Signature) Date/Time Received for Labora		COUNTY TOOK THE MARKET THE PROPERTY OF THE PRO
	S JOB NO.	SAMPLER(S): (Signature)	CATE- TIME	- 1	1	197:01 PS15	9 . 5	74:01 P2			1	79	4	j		Mellagulahed by: (Signature)	DO THE DE			1

The State of the S

Smithilling Spirit

AAF-S-0051-88

Soil

Sample Matrix:

QC Report No:

OR001.02 Job No.:

710 S. Illinois Avenue ES Oak Ridge Bill Hayden Address: Client: Attn:

37830 Oak Ridge, In. Suite F-103

1-31-899-24-88 mg/KG NA 19.3 Dilution Factor: Date Received: Date Reported: Conc. Trie: %Moisture:

> Duluth ANGB Project:

88092672-88092676, 88092731-88092741 88092781-88092783, 88092799-88092800

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal B Method	Blank	C1 2	Duplicate C2	RPD	SA	Spike R SR	Spike Recovery SR SSR	PR	Notes
Arsenic	88092672	88092672	10-16-88	VN	7060	<1.0	7060 <1.0 <1.24 <1.24	<1.24	NC	9.91	9.91 <1.24 7.96	7.96	80	
Cadmium	88092672	88092672	10-17-88	NA	7131	<0.50	<0.50 <0.62 <0.62	<0.62	NC	2.48	<0.62 2.73	2.73	110	
Chromium	n 88092672	88092672	10-18-88	NA	0109	<1.0	<1.0 14.2 12.5	12.5	13	96.4	4.96 14.2	25.8	234N	
Lead	88092672	88092672	10-16-88	NA	7421	<0.50	<0.50 3.97 3.44	3.44	-	96.4	4.96 3.97	7.68	75	

If % moisture is reported, results are presented on a dry-weight basis. See Legend attached. NOTE:

NA = Not Applicable NC = Not Calculated ND = Not Detected Cl = Concentration One C2 = Concentration Two x 100 $c_{1} - c_{2}$ Relative Percent Difference (RPD) =

= Concentration Two (c1 + c2)/2Percent Recovery (PR) = SSR - SR x 100

SSR = Spiked Sample Result SR = Sample Result SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY METALS

OR001.02 Job No.:

ES Oak Ridge Cl tent:

710 S. Illinois Avenue Bill Hayden

Address:

Attn;

37830 Oak Ridge, In. Suite F-103

TCP-S-0047-88 Soil Sample Matrix: QC Report No; Conc. Unit:

mg/KG

9-24-88 1-31-89 Dilution Factor: Date Received: Date Reported;

%Moisture:

Duluth ANGB Project: QC Report for Laboratory Sample No(s): 88092672-88092676, 88092731-88092741 88092781-88092783, 88092799-88092800

Laboratory Supervisor Approval:

Date Prep Date Anal Sample Nos. Spike Laboratory Duplicates Analyte

Method Anal

41.1 <20

5010

NA

10-17-88

88092672

88092672

Barium

42.3

964

41.1

95

514

Notes

PR

Spike Recovery

SA

RPD

 $C_{\mathbf{I}}$

Duplicate

Blank

1796

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

ND = Not Calculated ND = Not Detected Cl = Concentration One X 100 $c_{1} - c_{2}$ Relative Percent Difference (RPD)

= Concentration Two (c1 + c2)/2

Percent Recovery (PR) = SSR - SR x 100

SA

NA = Not Applicable,

SSR = Spiked Sample Result

SR = Sample Result SA = Spike Added (Concentration)

		-88092741 -88092800	Date Prep	MA	re present	7 /	
Avenue 37830		No(s): 6, 88092731-88092741 3, 88092799-88092800	Date Anal	10-17-88	= C1 - C2	-	
ES Oak Ridge Bill Hayden 710 S. Illinois Av Suite F-103 Oak Ridge, In. 3	th ANGB	Sample -8809267 -8809278	Sample Nos. Spike	88092672 10	ure is reported, r Difference (FPD) =	= SSR - SR × SA	-
ES ON BELL 710 SULTE OAK DAK	Duluth	for La	Laboratory Duplicates	88092672	% moisture Percent Diff	Recovery (PR)	89-DULU0831
Client: Attn: Address:	Project:	QC Report	Analyte	Mercury 1797	NOTE: If	Percent Re	

1797

QC Report No; Sample Matrix: Conc. Unit: Date Received: Date Reported: Dilution Factor: %Moisture:	CVM-S-0027-88 Soil mg/KG 9-24-88 1-31-89 NA 19.3
Laboratory Supervisor Approval:	Approval:

The Property

でおおきゅう

SHOOMER CALC.

fortigizings

Authorite. No. 3

Contraction of

Andelilles in

COLLECTY CONTROL ALSULA SUMMANA METALS

L. Area of Patricia

Control of Control of Control

子が現場を

OR001.02

Job No.:

Ana

PR A	110
Spike Recovery SR SSR	0.680
Spike F SR	0.620 <0.12 0.680
SA	0.620
e RPD	NC
Duplicate C2	<0.12
CI	<c.12< td=""></c.12<>
Blank	7471 <0.10 <0.12
Anal Method	7471
Date Prep	NA
Date Anal	10-17-88
Sample Nos. Spike	88092672
Laboratory Duplicates	88092672
Analyte	Mercury

Notes

110

0.620 <0.12 0.680

ed, results are presented on a dry-weight basis. NOTE:

Relative Percent Difference (FPD) =
$$\frac{C1-C2}{(C1+C2)/2}$$
 X 100 Cl = Concentration One NA = Not Applicable Cl + C2)/2 C2 = Concentration Two NC = Not Calculated NA = Not Detected

CASE NARRATIVE QUALITY CONTROL RESULTS SUMMARY

SAMPLE NO(S): 88092672-88092676, 88092731-88092741 SAMPLE NO(S): 88092781-88092783, 88092799-88092800

The detection limit for the analyte(s); arsenic, cadmium, chromium, lead, barium and mercury are provided by the sub-contract laboratory and based on a dry-weight of the sample.

A LEVEL TO BE DAY I							
Communication of	88			•			
Antonia de la constanta de la	TPH-S-0063-88	(5)	7-88 -88	2-88 88		roval:	***************************************
tumbaness (TPIL	Soil mg/KG	9-24-88	10-22-88	7 24.3	Laboratory Supervisor Approval:	
STREET, STREET	<u>:</u> :	: -	 5 5	۾ :: ت	tor:	upervis MB	-
Postification of	QC Report No:	Sample Matrix: Conc Juit:	Date Prepared:	Date Analyzed: Date Reported:	Dilution Factor: %Moisture:	atory S	
GUALITY CONTROL KESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS	QC Re	Sampl	Date	Date Date	Dilution F. #Moisture:	Labor	e and a second of the second o
-		ψ	710 S. Illinois Avenue	Tn. 37830		QC Report for Laboratory Sample No(s); 88092672-88092676 88092731-88092741	dan dan di yan dalama rak wasana dan di sek a dan dalam an anan da
facility . Define	OR001	ES Oak Ridge Bill Hayden	710 S. Illiin Suite F-103	Oak Ridge, Tn.	Duluth ANGB	aboratory Sample N 88092672-88092676 88092731-88092741	fond
* Approx. epitores enemant	OK	ES Bi	F 8	S C	DO	or Labo 88 88	
Transference Communication Com	Job No.:	Client: Attn:	Address:		Project:	QC Report fo	Laboratory

THE STATE OF THE SECOND

Laboratory	Anal								er je sprajetnijeni gas geptes selva am spanen das dagaj	to the same same and the same and the same same same same same same same sam
Sample No.	Method	Blank	SR	SA	MS	PR	MSD	PR	RPD	Notes
88092672	418.1	<100	<100	1320	1250	106	1290	98	٣	
Blank	418.1	<100	<100	1000	1100	110	. 1000	100	10	
1799										

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

0 MS = Spike Sample	SR = Sample Result
MSD = Spike Duplicate	SA = Spike Added (Concentrati
Relative Percent Difference (RPD) = $MS - MSD$ X 100 (MS + MSD)/2	Percent Recovery (PR) = $\frac{SSR - SR}{SA}$ x 100

NA = Not Applicable NC = Not Calculated ND = Not Detected

SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

Pages of the same of the same

OR001 Job No.:

VGC-S-0060-88

Sample Matrix:

Conc. Unit:

QC Report No:

ES Oak Ridge Bill Hayden Client:

710 S. Illinois Avenue

Address:

Attn:

37830 Oak Ridge, In. Suite F-103

Duluth ANGB

QC Report for Laboratory Sample No(s).:

88092672-88092676, 88092731-88092741 88092731-88092783, 88082255

Laboratory Supervisor Approval:

10-10-89 11-03-88

Dilution Factor:

% Moisture:

9-27-88 ug/KG Soil

> Date Received: Date Prepared: Date Analyzed: Date Reported:

Laboratory							6	6	ES	QC Limits
Sample No.	Compound	SA	SR	MS	PR	MSD	품	KFU	KPU	%kecovery
	Halocarbons: 8010									
88092739	1,1-dichloroethane	10	QN	8.32	83	5.50	55*	* I *	20	58-124
	Trichloroethene	10	Q.	7.90	79	6.34	63*	22*	16	75-110
1	Chlorobenzene	10	QN Q	90.9	61*	5.21	52*	15	21	71-125
80	Aromatics: 8020									
88092739	Benzene	10	2.3	13.8	115	8,33	*09	¥67	56	75-123
	Toluene	10	5.5	16.6	111	11.3	28*	38*	16	79-115
	Chlorobenzene	10	QN	07.6	76	8.21	82	14	24	82-112

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

See Case Narrative attached.

x 100 (MS + MSD)/2MS - MSD Relative Percent Difference (PR)

Percent Recovery (PR) = (MS or MSD) - SR x 100

MSD = Spike Sample MSD = Spike Sample Duplicate

SR = Sample Result SA = Spike Added (Concentration)

NA = Not Applicable NC = Not Calculated ND = Not Detected NT = Not Tested

QC-FRM3S

TY ... TROL SULL ... UMMAKEL VOLATILE ORGANICS EPA 8010/8020

C

geographics Walled

spinitely with

VGC-S-0060-888

ug/KG Soil

Sample Matrix:

QC Report No:

× NA

Date Received: Date Prepared: Date Analyzed: Date Reported:

Conc. Unit:

Job No.:

710 S. Illinois Avenue ES Oak Ridge Bill Hayden

Address:

Client: Attn: Suite F-103

37830 Oak Rydge, In.

Duluth ANGB Project:

88092672-88092676, 88092731-88092741 88092781-88092783, 88082255 QC Report for Laboratory Sample No(s).:

Laboratory Supervisor Approval:

10-10-88 11-03-88

NA NA

Dilution Factor:

% Moisture:

				-						
Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	ES RPD	QC Limits %Recovery
	Halocarbons: 8010							- -		
Rlank	1.1-dichloroethane	10	QN	9.46	95	10.4	104	6	20	58-124
	Trichloroethene	10	ON	9.33	93	9.61	96	ω,	16	75-110
· ·	Chlorobenzene	10	QN	8.78	88	9.11	91	4	7.7	/1-1/2
18	Aromatics: 8020									
30		0.	ΩŽ	9.24	92	10.0	100	8	26	75-123
1 grank	Delizelle	21	Q Q	9.38	96	9.53	95	2	16	79-115
	lotuene Chlorobenzene	10	Q.	9.10	16	9.25	92	2	24	82-112
					0;0:					

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

x 100 (MS + MSD)/2 MS - MSD Relative Percent Difference (PR)

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result SA = Spike Added (Concentral

Spike Added (Concentration)

Not Calculated Not Detected 11 li N N N

Not Applicable

!!

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO(S):: VGC-S-0060-88
QC REPORT NO(S):: VGC-S-0060-88B

Percent recovery and relative percent difference for some of the matrix spiking compounds are outside ES Laboratory acceptance limits. A blank spike analysis shows the laboratory to be in control.

Results for Sample No. 88092739 are reported on a wet weight basis, since percentage moisture was not performed.

:39°
Total Alian
energy descriptions
in property
S solite entities &
\$ with gettle sear
च्चित्रसम्बद्धीः र हत्युक्तस्य
Franchis equation
و دوره چه دوره و
Serve Political Comments of S
Pagin Kgdipan
1. Adequation of Sec. 4.
t-e-physical
है। इस्तिकामार्थ स्थाप
Bushing States
A SECTION ACCOUNTS

A Carry

METHOD BLANK SUMMARY

OR001 Job No:

Client: Attn:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, Tn. 37830 Address:

Duluth ANGB Project:

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/Kg 11-04-88

Laboratory Supervisor Approval:

Inclusive Sample Nos.	88092731-88092733		
CRD1.	0.25		
Conc	1.9		_
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform		
CAS Number	75-09-2		
Instru- ment ID	Porasil		
Fraction) ACC		
Date Analyzed	10-05-88		
tine 1D	09	1803	

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

ORO01

QC Report No.:

OCP-S-0037-88B

Client:

ES Oak Ridge

QC Sample No.: Level (Low/Med): Low

Blank

Attn:

Bill Hayden

Date Reported:

11-03-88

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

Project:

Duluth ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s).:

NWBurto

88092672-88092674, 88092731-88092737

37830

88092782-88092783

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2000	ND	37.0	56	46-127
Heptachlor	2000	ND	42.5	64	35-130
Aldrin	2000	ND	37.5	56	34-132
Dieldrin	5000	ND	115	69	31-134
Endrin	5000	ND	88.8	53	42-139
4,47-DDT	5000	ND	99.0	60	23-134

	MSD Conc.	Wan %	VO 8	9/	OC Lin	nits
	In Extract (ug/Kg)	MSD % Rec. #	MS % Rec.#	% RPD #	RPD	REC
Lindane	50.7	76	56	31	50	46-127
Heptachlor	49.0	74	64	14	31	35-130
Aldrin	39.8	60	56	6	43	34-132
Dieldrin	130	78	69	12	38	31-134
Endrin	108	65	53	20	45	42-139
4,4~-DDT	211	127	60	72*	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 1 out of 6 outside limits

Spike Recovery: 0 out of 12 outside limits

^{*} Values outside of QC limits

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

ORO01

QC Report No.: OCP-S-0037-88 QC Sample No.: 88092674

Client: Attn:

LS Oak Ridge Bill Hayden

Level (Low/Med): Low

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Date Reported: 11-03-88

QC Report for Laboratory Sample No(s).:

88092672-88092674, 88092731-88092737

88092782-88092783

10	NOS	N	\sim	

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2360	ND	49.2	62	46-127
Heptachlor	2360	ND	49.8	63	35-130
Aldrin	2360	ND	ND	NC*	34-132
Dieldrin	5916	ND	144	73	31-134
Endrin	5910	ND	122	62	42-139
4,47-DDT	5910	ND	160	81	23-134

	MSD Conc.	NCD &	VC V	9/	QC Lim	its
	In Extract (ug/Kg)	MSD % Rec.#	MS % Rec.#	% RPD#	RPD	REC
Lindane	59.5	76	62	19	50	-6-127
Heptachlor	66.7	85	63	29	31	35-130
Aldrin	49.5	63	NC*	NC*	43	34-132
Dieldrin	181	92	73	23	38	31-134
Endrin	152	77	62	22	45	42-139
4,4′-DDT	145	74	81	9	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 1 out of 6 outside limits

Spike Recovery: 1 out of 12 outside limits

^{*} Values outside of QC limits

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY QC REPORT NO.: OCP-S-0037-88 QC REPORT NO.: OCP-S-0037-88B

Matrix spike concentration is not detected for aldrin, therefore, spike recovery and relative percent difference are not calculated. A blank spike analysis shows the laboratory to be in control.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up required by these samples.

PESTICIDE METHOD BLANK SUMMARY

Job No.:

ORO01

Lab Name: Engineering Science Lab Sample No.: Blank

Client:

ES Oak Ridge

Attn: Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Matrix:

Soil

Level (low/med): Low

Extraction:

(SepF/Cont/Sonc): Sonc

Date Reported: 11-03-88

Project:

Duluth ANGB

Date Extracted:

10-07-88

Date Analyzed (1): 10-25-88

Time Analyzed (1): 11:47

Instrument ID (1): 5890 #2

GG Column ID (1): OV-1

Date Analyzed (2): 10-26-88

Time Analyzed (2): 09:23 Instrument ID (2): 5880

GC Column ID (2): Mixed

This Method Blank applies to the following samples, MS and MSD.

- Company	EPA Sample No.	Lab Sample ID (1)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2
		88092731 88092732 88092733	10-25-88 10-25-88 10-25-88	88092731 88092732 88092734	10-26-88 10-26-88 10-26-88
-	- - -	88092734 88092735 88092736	10-25-88 10-25-88 10-25-88	88092735 88092736 88092737	10-26-88 10-26-88 10-26-88
;	- - -	88092737 88092782 88092783	10-25-88 10-25-88 10-25-88	88092782 88092783	10-26-88
t question where the					
-continue parametral		-			
entre despisa					
Passa in exemplations of the Passa in the Pa					
ing executivesing					
and Thiesten Appendix					

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

Job No.:	08001	QC Report No:	BNA-S-0052-88	
		Sample Matrix:	Soil	
Client:	ES Oak Ridge	Conc. Unit:	ug/KG	
Attn:	Bill Hayden	Date Received:	9-29-88	
Address:	710 S. Illinois Avenue	Date Prepared:	10-07-88	
	Suite F-103	Date Analyzed:	11-10-88	
	Oak Ridge, In. 37830	Date Reported:	12-13-88	
		Dilution Factor:	NA	
		ZMoisture:	15.4	
Project:	Duluth ANGB			
		Laboratory Supervisor Approval:	Approval:	

	EPA QC Lim RPD ZRecove
	RPD
Les .	PR
Montes	MSD
	PR
	MS
83 74	SR
782-88092783 672-88092674	SA
QC Report for Laboratory Sample No(s): 88092731-88092733, 88092782-88092783 88092799-88092805, 88092672-88092674	Compound
QC Report fo	Fraction

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit ZRecovery
	1,2,4-Trichlorobenzene	3920	QN	2070	53	2090	53	2	[23	38-147
B/N	Acenaphthene	3920	ě	2510	64	2490	64		61	31-137
Laboratory	2,4-Dinitrotoluene	3920	QN	2870	73	2940	7.5	2	47	24-80
Sample #	Pyrene	3920	QN	2290	58	2300	59	7	36	35-142
88092674	N-Nitroso-di-n-Propylamine	3920	£	2640	29	2720	69	m	38	41-126
1	1,4-Dichlorobenzene	3920	QZ QZ	1160	30	1110	28	7	27	28-104
8	Pentachlorophenol	7840	QN -	1 8000	102	7880	101	2	47	17-169
ACID ACID	Phenol	7840	2	4590	59	4470	57	<u>س</u>	35	26-90
ra T	2-Chlorophenol	7840	QZ —	4550	58	4310	55	2	20	25-102
Sample #	4-Chloro-3-Methylphenol	7840	QN	6200	79	6310	80	2	33	26-103
88092674	4-Nitrophenol	7840	QN —	6160	79	6120	78	7	20	11-114
			<u> </u>							

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

x 100 (MS + MSD)/2Relative Percent Difference (RPD) - MS - MSD

Percent Recovery (PR) = $\frac{\text{(MS or MSD)}-\text{SR}}{\text{SA}} \times 100$

MS = Spike Sample
MSD = Spike Duplicate
SR = Sample Result
SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

88-A1-DULII0697 1

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO.: 88092732
WORK ORDER NO.: 1048

The first analysis of sample 88092732 resulted in area counts for one or more internal standards that were below EPA QC criteria. The extract was re-analyzed out of holding time. The analysis resulted in acceptable area counts for all internal standards.

OR001 Job No: Client: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, In. 37830

Duluth ANGB Project:

Sample Matrix: Conc. Unit: Date Reported:

So 11 ug/KG 12-12-88

Laboratory Supervisor Approval:

Inclusive Sample Nos.	88092731-88092733 88092782-88092783 88092799-88092805	
CRDL	ı	
Conc	1	
Compound (HSL, TIC or Unknown)	None Detected	·
CAS Number	ı	
Instru- ment ID	7	
Fraction	BNA	
Date Analyzed	11-15-88	
File 1D	E6240	1810

ن بالان با

:

יעון וועיי.

4B

Job No.:

Client: Attn:

Address:

Work Order No.:

Lab Sample No.: 04-07 Lab File ID: E6240

Matrix: 500/ Level (low/med):

Date Analyzed: 11-15-78 Time Analyzed: 18:51

Instrument ID: Date Reported:

Project: Dulth

This Method Blam applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
DANGO-BG-SL3-SDI	88092731	F6241	11-15-88
-B6-5LD-5D1	88092732	E2245,50616	11-15-88, 11-30.88
-BG - SLI-SDI	88092733	F6244	11-15-88
- SGC 4- SSI - RESAMPL	F 89092782	E6242	11-15-88
-5 GC4 - 557- RESAMPLE	88092783	E6243, E6341	11-15-88,11-29-88
-2-567-501	88092399	50538	11-15-83
-2-516-5D1	88092800	50539	11-15-88
-2- SL29 - SDI	88092901	50540	11-15-88
-3-SL29-SDI	89092802	50541	11-15-88
-3-5L10-5D1-	88092803	5042	11-15-88
-3-5L9-5D1	88092804	505 43	11-15-18
-3-548-5D1	88092805	50544, 50629	11-16-88, 12-1-88
Title A			
į. 			
444 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			
e			

VOLATILE CONTINUING CALIBRATION CHECK

LabName:		Co	ontract:_		
Lab Code: Case I	No.:		SAS No.	•	SDG No.:
Instrument ID. CARbopak	_ Calibr	ation [Date(s):_	10/5/88) >
LAB FILE ID: #38/39					
COMPOUND	RRF	 RRF50	%D		anna and delp style delp time time time and ^{emb} racies tible delp time and an
	_	`			
Benzyl chloride	0.37	0.30	<u> </u>		
bis (2-chloroethoxy	1 1	;	•		
methane					
bis (2-chloroisopropyl	1 1	1		_	
ether					
Bromobenzene		1.a			
Bromodichloromethane	3.7	4.2			
Bromoform	17.1	3.0	18		
Bromomethane	10.20	<u>c.21</u>	_5		
Carbon tetrachloride	4.2	4.5	7		
Chloroacetaldehyde			_		
	1.4	1.5	7		
Chloroethane	0.72	044	39		
Chloroform	39	4.6	18		
	1.2	c-98	18:	,	
2-Chloroethyl vinyl ether_	<u>- </u>		-		
Chloromethane	10.46	0.49	7		
Chloromethyl methyl ether_			_		
o_,m_,& p_Chlorotoluenes _	4.6	3.9	15		
Dibcomochlocomethane	! 3.7!	4.1	: (1 :		•
Dibromomethane	3 . 2	2.4	25		
1,2_Dichlorobenzene	2.5	2.6	H		
1,3_Dichlorobenzene 1,4_Dichlorobenzene	2.3	<i>₹</i> .3	0		
Dichlorodifluormethane					
1,1_Dichloroethane	2.4	2.5	4		
1,2_Dichloroethane	2.6	3 U	15		
1,1_Dichloroethylene	2.6	3.5	4		
trans_1,2_dichloroethylene		2.6	8		
Dichloromethane	4.7	16	*		
1,2_Dichloropropane	2.5	25	0		
1,3_Dichloropropylene	5.9	4.7	20		
1,1,2,2_Tetrachloroethane_	7.5	7.7	3	•	
1,1,1,2_Tetrachloroethane_		4.2	19	•	
Tetrachloroethylene	3.5	7.7	3	•	
1,1,1_Trichloroethane	3.0	3.3	10	}	
1,1,2_Trichloroethane	5.4	4.7	20		
Trichloroethylene	4.0	4.1	3	- 	
Trichlorofluormethane	3.3	2.3	D		
Trichloropropane	21	1.4	33	•	
	0.94	· (†	

file: 8020CONT 3 Nov 88

VOLATILE CONTINUING CALIBRATION CHECK LabName: ______ Contract: ______ Lab Code: ____ Case No.: ____ SDG No.: _____

Instrument ID.: CAR Calibration Date(s): 10/5/88

LA3 FILE ID: #38 Inst. Calib. Date(s): 9/19/88

COMPOUND	RRF	RRF5Ø	% D
Benzene	4.9	<u>5-2</u>	_6_
Chlorobenzene	5 3	5.7	8
1,2_Oichlorobenzene	4.4	43	2
1,3_Dichlorobenzene	15.0	5.3	
1,4_Oichorobenzene Eth: 1 Bezene	4.4	7.5	3
Tolcane	13.9	4.5	15
Xylenes	1-2	73	0

This page intentionally left blank.

DATA PACKAGE #29

This page intentionally left blank.

RESEARCH AND DEVELOPMENT LABORATORY 600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 841-7353

REVISED REPORT

Job No.:

OR001

Work Order No.:

941

Client:

ES Oak Ridge

Attention:

Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

37830

Project:

Duluth ANGB

Attached are the analytical reports for the soil sample(s) received by this laboratory on 9-01-88.

Sample Preparation Data

didining.	Laboratory	Client		Date	Date*	Date Date*
į.	Sample No.	Sample ID	Test	collected		analyzed 2nd col.
1					extracted	
T.	88092250	DANGB8-MW14-SS3	BA-I	8-31-88		10-17-88
(C. 184)	88092250	DANGB8-MW14-SS3	CD-F	8-31-88		10-17-88
2	88092250	DANGB8-MW14-SS3	CR-F	8-31-88		10-17-88
÷	88092250	DANGB8-MW14-SS3	PB-F	8-31-88		10-17-88
	88092250	DANGB8-MW14-SS3	418.1	8-31-88	9-22-88	9-23-88
	88092250	DANGB8-MW14-SS3	MOIS	8-31-88		9-09-88
	88092250	DANGB8-MW14-SS3	8010	8-31-88		9-13-889-11/12-88
	88092250	DANGB8-MW14-SS3	8020	8-31-88		9-13-88 9-11-88
	88092250	DANGB8-MW14-SS3	8080	8-31-88	9-07-88	10-05-88
•	88092250	DANGB8-MW14-SS3	8270	8-31-88	9-10-88	10-21-88
ş	88092251	DANGB8-MW14-SS9	BA-I	8-31-88		10-17-88
¥400	88092251	DANGB8-MW14-SS9	CD-F	8-31-88		10-17-88
	88092251	DANGB8-MW14-SS9	CR-F	8-31-88		10-17-88
	88092251	DANGB8-MW14-SS9	PB-F	8-31-88		10-17-88
	88092251	DANGB8-MW14-SS9	418.1	8-31-88	9-22-88	9-23-88
	88092251	DANGB8-MW14-SS9	MOIS	8-31-88		9-09-88
	88092251	DANGB8-MW14-SS9	8010	8-31-88		9-13-889-11/12-88
	88092251	DANGB8-MW14-SS9	8020	8-31-88		9-13-88 9-11-88
	88092251	DANGB8-MW14-SS9	8080	8-31-88	9-07-88	10-05-88
i .	88092251	DANGB8-MW14-SS9	8270	8-31-88	9-10-88	10-21-88
			, -			-

* If applicable

89-DULU0865 1

CL-FRM01

Job No.: OR001

Work Order No.: 941

Project: Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092252	DANGB-MW20-SS5	BA-I	8-31-88		10-20-88	**************************************
88092252	DANGB-MW20-SS5	CD-F	8-31-88		10-20-88	
88092252	DANGB-MW20-SS5	CR-F	8-31-88		10-20-88	
88092252	DANGB-MW20-SS5	PB-F	8-31-88		10-20-88	
88092252	DANGB-MW20-SS5	418.1	8-31-88	9-22-88	9-23-88	
88092252	DANGB-MW20-SS5	MOIS	8-31-88		9-09-88	
88092252	DANGB-MW20-SS5	8010	8-31-88		9-13-889	-11/12-88
88092252	DANGB-MW20-SS5	8020	8-31-88			9-11-88
88092252	DANGB-MW20-SS5	8080	8-31-88	9-07-88	10-05-88	
88092252	DANGB-MW20-SS5	8270	8-31-88	9-10-88	10-21-88	
			12-19-88Re 1-18-89Re			
88092253	DANGB8-MW20-SS1	BA-I	8-31-88		10-20-88	
88092253	DANGB8-MW20-SS1	CD-F	8-31-88		10-20-88	
88092253	DANGB8-MW20-SS1	CR-F	8-31-88		10-20-88	
88092253	DANGB8-MW20-SS1	PB-F	8-31-88		10-20-88	
88092253	DANGB8-MW20-SS1	418.1	8-31-88	9-22-88	9-23-88	
88092253	DANGB8-MW20-SS1	MOIS	8-31-88	<u> </u>	9-09-88	
88092253	DANGB8-MW20-SS1	8010	8-31-88			9-11/12-88
88092253	DANGB8-MW20-SS1	8020	8-31-88		9-13-88	•
88092253	DANGB8-MW20-SS1	8080	8-31-88	9-07-88	10-05-88	
88092253	DANGB8-MW20-SS1	8270	8-31-88		NA	

^{*} If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S): 88092250 - 88092253
WORK ORDER NO:: 941

These soil samples were received at the ES Berkeley Laboratory on 09-01-88. They were received cold and intact.

CASE NARRATIVE QUALITY CONTROL RESULTS SUMMARY WORK ORDER NO.: 941 EPA 8270 ANALYSIS

These samples were first extracted on September 10, 1988, within holding time, and first analyzed on October 21, 1988, one day out of holding time. Two or more surrogate spike recoveries for sample 88092252 were outside of EPA QC limits. This sample was reextracted and analyzed.

Surrogate spike recoveries met EPA criteria in the second analysis. Results of the second analysis are reported. The area count of the sixth internal standard was outside of EPA QC limits; however, the previous analysis showed there were no compounds of interest that were related to the sixth internal standard.

Sample 88092253 was not analyzed because it was a repeat of an earlier sample.

PAGE 1

ANALYSIS REPORT

WORK ORDER NUMBER: 941

JOB NUMBER : ZB0000000440

WORK ORDER DATE : 09/01/88

APPROVED BY

ah Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROD1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 2, UNITS: mg/L

DANGB8,MW14,SS3 DANGB8,MW14,SS9 DANGB,MW20,SS5 DANGB8,MW20,SS1

TEST COMPOUND	88092250	88092251	88092252	88092253
ACID DIG SOIL	NA	NA	NA	NA
BARIUM	56.6	61.3	82.1	146
CADMIUM	10.3N	10.1N	8.6N	9.0N
CHRONIUM	41.0	43.2	37.8	38.6
LEAD	11.4N	11.4N	10.5	12.1

2

ENGINEERING-SCIENCE INC. 12/05/88

PAGE 2

ANALYSIS REPORT

JORK ORDER NUMBER: 941

JOB NUMBER : 28000000440

JORK ORDER DATE : 09/01/88

APPROVED BY

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

DAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES DAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 3, UNITS: mg/Kg

DANGB8, MW14, SS3 DANGB8, MW14, SS9 DANGB, MW20, SS5 DANGB8, MW20, SS1

FEST COMPOUND	88092250	88092251	88092252	88092253
44 4 22224 2121 1122222222				-40
•18.1 PETROLEUM HYDROCARBONS • MOISTURE	<10 8.7	<10 0 1	20 10.8	<10 11.6
4 MOTOTOKE	0.1	7.1	10.6	11.0

ANALYSIS REPORT

WORK ORDER NUMBER: 941

JOB NUMBER : 280000000440

WORK ORDER DATE : 09/01/88

APPROVED BY APPROVED BY Lab Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TH 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: ug/Kg, GROUP 8010

DANGB8,MW14,SS3 DANGB8,MW14,SS9 DANGB,MW20,SS5 DANGB8,MW20,SS1

Kelifersen	TEST COMPOUND	88092250	88092251	88092252	88092253
ž	BENZYL CHLORIDE	ND	ND	ND	ND
A CHEST AND	BIS (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND
2	BIS (2-CHLOROISOPROPYL)ETHER		ND	ND	ND
	BRONOBENZENE	ND	ND	ND	ND
ş	BROMODICHLOROMETHANE	ND	ND	ND	ND
eres/men	BRONOFORM	ND	ND	ND	ND
ĭ	BROMOETHANE	ND	ND	ND	ND
	CARBON TETRACHLORIDE	ND	ND	ND	ND
	CHLORACETALDEHYDE	ND	ND	ND	ND
	CHLORAL	ND	ND	ND	ND
	CHLOROBENZENE	ND	ND	ND	ND
,	CHLOROETHANE	ND	ND	ND	ND
:	CHLOROFORM	120	ND	0.74	0.53
į	1-CHLOROHEXANE	ND	ND	ND	ND
	2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND
1	CHLOROMETHANE	ND	ND	ND	ND
	CHLOROMETHYL METHYL ETHER	ND	ND	ND	ND
à	CHLOROTOLUENE	ND	ND	ND	ND
	DIBROMOCHLOROMETHANE	ND	ND	ND	ND
7	DIBROMOMETHANE	ND	ND	ND	ND
	1,2-DICHLOROBENZENE	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	ND	ND	ND	ND
ğ	1,4-DICHLOROBENZENE	ND	ND	ND	ND
004888	DICHLORODIFLUOROMETHANE	ND	ND	ND	ND
Š	1,1-DICHLOROETHANE	ND	ND	ND	ND
	1,2-DICHLOROETHANE	MD	ND	ND	ND
тинея	1,1-DICHLOROETHYLENE	ND	ND	ND	ND
ğ E	TRANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND
2	DICHLOROMETHANE	1400B	4.68	0.488	0.35B
-	1,2-DICHLOROPROPANE	ND	NO	ND	ND

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/05/88

ANALYSIS REPORT FOR WORK JRDER NUMBER 941

EST COMPOUND	DANGB8,MW14,SS3 88092250	DANGB8,MW14 RS9 88092251	DANGB, MW20, \$\$5 88092252	DANGB8,MW20,SS1 88092253
,3-DICHLOROPROPYLENE	ND	ND	ND	ND
,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND
,1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND
ETRACHLOROETHYLENE	ND	ND	ND	ND
,1,1-TRICHLOROETHANE	ND	ND	ND	ND
,1,2-TRICHLOROETHANE	ND	ND	ND	ND
RICHLOROETHYLENE	ND	ND	ND	ND
RICHLOROFLUOROMETHANE	ND	ND	ND	ND
RICHLOROPROPANE	ND	ND	ND	ND
'INYL CHLORIDE	ND	ND	ND	ND

D - Not Detected

ANALYSIS REPORT

JORK ORDER NUMBER: 94

JOB NUMBER : 280000000440

WORK ORDER DATE : 09/01/88

APPROVED BY

ab Supervisor

REPORT DATA:

LES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT : BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: ug/Kg, GROUP 8020

DANGB8,MW14,SS3 DANGB8,MW14,SS9 DANGB,MW20,SS5 DANGB8,MW20,SS1

TEST COMPOUND	88092250	88092251	83092252	88092253
BENZENE	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND
ETHYL BENZENE	ND	ND	ND	ND
TOLUENE	220	ND	39 0	160
XYLENES	NO	ND	ND	ND

ENGINEERING-SCIENCE INC. 12/05/88

PAGE 6

ANALYSIS REPORT

ORK ORDER NUMBER: 941

OB NUMBER : 280000000440

ORK ORDER DATE : 09/01/88

APPROVED BY Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

AK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/Kg, GROUP 8080

DANGB8, MW14, SS3 DANGB8, MW14, SS9 DANGB, MW20, SS5 DANGB8, MW20, SS1

EST COMPOUND	88092250	88092251	88092252	88092253	
LDRIN	ND	ND	ND	ND	
LPHA-BHC	ND	ND	ND	ND	
ETA-BHC	ND	ND	ND	ND	
ELTA-BHC	ND	ND	ND	ND	
AMMA-BHC	ND	ND	ND	ND	
HLORDANE	ND	ND	ND	ND	
,41-DDD	ND	ND	ND	ND	
,41-DDE	ND	ND	ND	ND	
,4'-DDT	ND	ND	ND	ND	
IELDRIN	ND	ND	ND	ND	
.NDOSULFAN I	ND	ND	ND	ND	
NDOSULFAN II	ND	ND	ND	ND	
NDOSULFAN SULFATE	ND	ND	ND	ND	
NDRIN	ND	ND	ND	ND	
NDRIN ALDEHYDE	NA	NA	NA	NA	
EPTACHLOR	ND	ND	ND	ND	
EPTACHLOR EPOXIDE	ND	ND	ND	ND	
EPONE	NA	NA	NA	NA	
ETHOXYCHLOR	MD	ND	ND	ND	
OXAPHENE	MD	ND	ND	ND	
CB-1016	ND	ND	ND	ND	
CB-1221	MD	ND	ND	ND	
CB-1232	ND	ND	ND	ND	
CB-1242	ND	ND	ND	ND	
CB-1248	ND	ND	ND	ND	
CB-1254	MD	ND	ND	ND	
CB-1260	NO	ND	ND	ND	

NA - Not Analyzed

D - Not Detected

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received: September 1, 1988 Date Reported: December 8, 1988

Work Order: 941 Job Number: OR001

ATTN: Mr. Bill Hayden

FOR:

The state of the s

ES:Oak Ridge/Duluth ANGB

Address: 710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830

Tab Number:	88092250	88092251
Lab Number: Sample No.:	DANGB-8-MW14-	DANGB-8-MW14-
•	SS3	SS9
<pre></pre>	8-31-88	8-31-88
Date Sampled: Time Sampled: Date Extracted:	08:20	08:20
Date Extracted:	9-10-88	9-10-88
Date Analyzed: Percent Moisture:	10-21-88	10-21-88
Percent Moisture:	9	9

Compound	Detection Limits		AL RESULTS veight)
Team opposit	ug/kg	ug/kg	ug/kg
g-1,3-Dichlorobenzene	330	ND	ND
1,4-Dichlorobenzene Hexachloroethane Bis(2-chloroethyl)ether	330	ND	ND
Hexachloroethane	330	ND	ND
Bis(2-chloroethyl)ether	330	ND	ND
1,2-Dichlorobenzene	330	ND	ND
N-Nitrosodimethylamine	330	ND	ND
Bis(2-chloroisopropyl)ethe	r 330	ND	ND
N-Nitrosodi-n-propylamine	330	ND	ND
Hexachlorobutadiene	330	ND	ND
1,2,4-Trichlorobenzene	330	ND	ND
_g .Nitrobenzene	330	ND	ND
Isophorone	330	ND	ND
-Naphthalene	330	ND	ND
Bis(2-chloroethoxy)methane	330	ND	ND
2-Chloronaphthalene	330	ND	ND
Hexachlorocyclopentadiene	330	ND	ND
Acenaphthylene	330	ND	ND
-Acenaphthene	330	ND	ND
Dimethyl phthalate	330	ND	ND
2,6-Dinitrotoluene	330	ND .	ND
Fluorene	330	ND	ND
2,4-Dinitrotoluene	330	ND	ND
LDiethyl phthalate	330	ND	ND
N-Nitrosodiphenylamine	330	ND	ND
Hexachlorobenzene	330	ND	ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Jate Received: September 1, 1988 Work Order: 941
Jate Reported: December 8, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.:	88092250 DANGB-8-MW14- SS3	88092251 DANGB-8-MW14- SS9
Date Sampled:	8-31-88	8-31-88
Time Sampled:	08:20	08:20
Date Extracted:	9-10-88	9-10-88
Date Analyzed:	10-21-88	10-21-88
Percent Moisture:	9	9

Compound	etection Limits		L RESULTS eight)
	ug/kg	ug/kg`	ug/kg
Phenanthrene	330	ND	ND
Anthracene	330	ND	ND
Dibutyl phthalate	330	ND	ND
Fluoranthene	330	ND	ND
4-Chlorophenyl phenyl ether	330	ND	ND
Pyrene	330	ND	ND
Butyl Benzyl phthalate	330	ND	ND
5is(2-ethylhexyl) phthalate	330	ND	ND
Thrysene	330	ND	ND
4-Bromophenyl phenyl ether	330	ND	ND
Benzo(a)anthracene	330	ND	ND
⊃i~n-octylphthalate	330	ND	ND
Benzo(b)fluoranthene	330	ND	ND
Benzo(k)fluoranthene	330	ND	ND
Benzi dine	2000	ND	ND
3,3'-Dichlorobenzidine	660	ND	ND
Benzo(a)pyrene	330	ND	ND
Indeno(1,2,3-cd)pyrene		ND	ND
Dibenzo(a,h)anthracene	330	ND	ND
Benzo(ghi)perylene	330	ND	ND
Benzyl Alcohol	660	ND	ND

Priority Pollutant Analysis Base Neutrals - SW 8270

Page 3 of 5

Matrix: Soil (continued)

Date Received: September 1, 1988 Work Order: 941 Date Reported: December 8, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092250	88092251
Sample No.:	DANGB-8-MW14-	DANGB-8-MW14-
	553	SS9
Date Sampled:	8-31-88	8-31-88
Time Sampled:	08:20	08:20
Date Extracted:	9-10-88	9-10-88
¹ Date Analyzed:	10-21-88	10-21-88
Percent Moisture:	9	9

Compound	Detection Limits	Analytical Results (dry weight)	
	ug/kg	ug/kg	ug/kg
Acetophenone	*	ND	ND
Aniline	*	ND	ND
·4-Aminobiphenyl	*	ND	ND
4-Chloroaniline	660	ND	ND
1-Chloronaphthalene	*	ND	ND
Dibenzofuran	330	ND	ND
p-Dimethylaminoazobenzene	?*	ND	ND
7,12-Dimethylbenz(a)anthr	racene*	ND	ND
a-,a-Dimethylphenethylami		ND	ND
Diphenylamine	*	ND	ND
1,2-Diphenylhydrazine	*	ND	ND
Ethyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	*	ND	ND
Methyl methanesulfonate	*	ND	ND
2-Methylnaphthalene	330	ND	ND
1-Naphthylamine	*	ND	ND
2-Naphthylamine	*	ND	ND
2-Nitroaniline	1600	ND	ND
- 3-Nitroaniline	1600	ND	ND
4-Nitroaniline N-Nitroso-di-n-butylamine	1600	ND	ND
N-Nitroso-di-n-butylamine	·*	ND .	ND
N-Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	*	ND	ND
Pentachloronitrobenzene	*	ND	ND
Phenacetin	*	ND	ND
^r 2-Picoline	~~ *	ND	ND
Pronamide	*	ND	ND
1,2,4,5-Tetrachlorobenzer	ne∗	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: September 1, 1988 Work Order: 941
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.:	88092250 DANGB-8-MW14- SS3	88092251 DANGB-8-MW14- SS9
Date Sampled:	8-31-88	8-31-88
Time Sampled:	08:20	08:20
Date Extracted:	9~10-88	9-10-88
Date Analyzed:	10-21-88	10-21-88
Percent Moisture:	9	9

Compound	Detection Limits		TICAL RESULTS ry weight)
	ug/kg	ug/kg	ug/kg
Alpha-BHC	*	ND	ND
Gamma-BHC	—— x	ND	ND
Beta-BHC	660	ND	ND
Heptachlor	330	ND	ND
Delta-BHC	500	ND	ND
Aldrin	330	ND	ND
Heptachlor epoxide	330	ND	ND
Endosulfan I	*	ND	ND
Dieldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
Endrin	*	ND	ND
Endosulfan II	*	ND	ND
4,4'-DDD	500	ND	ND
4,4'~DDT	830	ND	ND
Endosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
Endrin Ketone	 ★	ND	ND
Chlordane	2000	ND	ND
Methoxychlor	~-*	ND	ND
Toxaphene	2000	ND	ND
Aroclor-1016	2000	ND	· ND
Aroclor-1221	2000	ND	ND
Aroclor-1232	2000	ND	ND
Aroclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND
Aroclor-1254	2000	ND	ND
Aroclor-1260	2000	ND	ND

^{*} EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: September 1, 1988 Work Order: 941
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092250	88092251
Lab Number: Sample No.:	DANGB-8-MW14-	DANGB-8-MW14-
Minor Control of Contr	SS3	SS9
Date Sampled:	8-31-88	8-31-88
Time Sampled:	08:20	08:20
Time Sampled: Date Extracted:	9-10-88	9-10-88
Date Analyzed:	10-21-88	10-21-88
Percent Moisture:	9	9

		Detection Limits	ANALYTICA:	
Union through the state of the		ug/kg	ug/kg	ug/kg
ž	2-Chlorophenol	330	ND	ND
• ·	2-Nitrophenol	330	ND	ND
Negations .	Phenol	330	ND	ND
4	2,4-Dimethylphencl	330	ND	ND
ŧ	2,4-Dichlorophenol	330	ND	ND
S-angues	2,4,6-Trichlorophenol	330	ND	ND
ł	4-Chloro-3-methylphenol	660	ND	ND
	2,4-Dinitrophenol	1600	ND	ND
	2,6-Dichlorophenol	*	ND	ND
ì	2-Methyl-4,6-Dinitrophenol	1600	ND	ND
	Pentachlorophenol	1600	ND	ND
1	4-Nitrophenol	1600	ND	ND
	Benzoic Acid	1600	ND	ND
(2-Methylphenol	330	ND	ND
E	3- & 4-Methylphenol	330	ND	ND
	2,3,4,6-Tetrachlorophenol	*	ND	ND
ł	2,4,5-Trichlorophenol	330	ND	ND

Maria Kork

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

rate Received: September 1, 1988 Work Order: 941 ate Reported: February 20, 1989 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 ab Number:
 88092252

 ample No.:
 DANGB-8-MW20-SS5

 ate Sampled:
 8-31-88

 ime Sampled:
 08:45

 ate Extracted:
 12-19-88

 ate Analyzed:
 01-18-89

 ercent Moisture:
 11

ompound Detection ANALYTICAL RESULTS Limits (dry weight) ug/kg ug/kg ,3-Dichlorobenzene 330 ND ,4-Dichlorobenzene 330 ND exachloroethane 330 ND is(2-chloroethyl)ether 330 ,2-Dichlorobenzene 330 -Nitrosodimethylamine 330 ND ND ND is(2-chloroisopropyl)ether 330 ND -Nitrosodi-n-propylamine 330 ND .exachlorobutadiene 330 ND ,2,4-Trichlorobenzene 330 ND itrobenzene 330 ND sophorone 330 ND aphthalene 330 ND is(2-chloroethoxy)methane 330 ND -- Chloronaphthalene 330 ND exachlorocyclopentadiene 330 ND cenaphthylene 330 ND .cenaphthene 330 ND imethyl phthalate 330 ND ,6-Dinitrotoluene 330 ND luorene 330 ND ,4-Dinitrotoluene iethyl phthalate 330 ND 330 ND -Nitrosodiphenylamine 330 ND exachlorobenzene 330 ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

bate Received: September 1, 1988 V
Date Reported: February 20, 1989

Work Order: 941
Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.:

88092252 DANGB-8-MW20-

SS5

Date Sampled:
Time Sampled:
Date Extracted

8-31-88 08:45

ate Extracted:
ate Analyzed:

12-19-88

Pate Analyzed:
Percent Moisture:

01-18-89

11

Compound	etection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg
henanthrene	330	ND
Anthracene	330	ND
Dibutyl phthalate	330	ND
'luoranthene	330	ND
4-Chlorophenyl phenyl ether	330	ND
Pyrene	330	ND
Butyl Benzyl phthalate	330	ND
Bis(2-ethylhexyl) phthalate	330	ND
Chrysene	330	ND
:-Bromophenyl phenyl ether	330	ND
Benzo(a)anthracene	330	ND
Di-n-octylphthalate	330	ND
Benzo(b)fluoranthene	330	ND
Benzo(k)fluoranthene	330	ND
Benzidine	2000	ND
,3,3'-Dichlorobenzidine	660	ND
Benzo(a)pyrene	330	ND
indeno(1,2,3-cd)pyrene	330	ND
Dibenzo(a,h)anthracene	330	ND
[]enzo(ghi)perylene	330	ND
enzyl Alcohol	660	ND

(continued)

ate Received: September 1, 1988 Work Order: 941 ate Reported: February 20, 1989 Job Number: OR001

or: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number: 88092252
ample No.: DANGB-8-MW20SS5
ate Sampled: 8-31-88
ime Sampled: 08:45
ate Extracted: 12-19-88
ate Analyzed: 01-18-89
ercent Moisture: 11

ompound	Detection Limits ug/kg	Analytical Results (dry weight) ug/kg
cetophenone	*	ND
niline	*	ND
-Aminobiphenyl	×	ND
-Chloroaniline	660	ND
-Chloronaphthalene	*	ND
ibenzofuran	330	ND
-Dimethylaminoazobenzer	1e∗	ND
,12-Dimethylbenz(a)anth	racene*	ND
-,a-Dimethylphenethylam	nine∗	ND
iphenylamine	*	ND
,2-Diphenylhydrazine	 ★	ND
thyl methanesulfonate	 ∗	ND
-Methylcholanthrene	*	ND
ethyl methanesulfonate	*	ND
-Methylnaphthalene	330	ND
-Naphthylamine	 ★	ND
-Naphthylamine	*	ND
-Nitroaniline	1600	ND
-Nitroaniline	1600	ND
-Nitroaniline	1600	ND
-Nitroso-di-n-butylamir	1e∗	ND
-Nitrosopiperidine	 ★	ND
entachlorobenzene	*	ND
entachloronitrobenzene	 *	ND
henacetin	*	ND
-Picoline	*	ND
ro namide	*	ND
,2,4,5-Tetrachlorobenze	ene*	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

bate Received: September 1, 1988 Work Order: 941 Date Reported: February 20, 1989 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

The section of the se

Lab Number: 88092252 Sample No.: DANGB-8-MW20-Date Sampled: 8-31-88 Time Sampled: 08:45 Date Extracted: 12-19-88 Date Analyzed: 01-18-89 Percent Moisture: 11

Compound .	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
Alpha-BHC	*	ND	
Gamma-BHC	 *	ND	
Beta-BHC	660	ND	
deptachlor	330	ND	
Delta-BHC	500	ND	
Aldrin	330	ND	
deptachlor epoxide	330	ND	
Endosulfan I	*	ND	
Dieldrin	500	ND	
1,4'-DDE	1000	ND	
Endrin	*	ND	
Endosulfan II	*	ND	
1,4'-DDD	500	ND	
4,4'-DDT	830	ND	
Endosulfan Sulfate	1000	ND	
Endrin aldehyde	*	ND	
Endrin Ketone	*	ND	
Chlordane	2000	ND	
Methoxychlor	 *	ND	
noxaphene	2000	ND	
Aroclor-1016	2000	ND	
Aroclor-1221	2000	ND	
Aroclor-1232	2000	ND	
Aroclor-1242	2000	ND	
Aroclor-1248	2000	ND	
Aroclor-1254	2000	ND	
Aroclor-1260	2000	ND	

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

ate Received: September 1, 1988 ate Reported: February 20, 1989

Work Order: 941
Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB

ercent Moisture:

ATTN: Mr. Bill Hayden

ddress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number: 88092252
ample No.: DANGB-8-MW20SS5
ate Sampled: 8-31-88
ime Sampled: 08:45
ate Extracted: 12-19-88
ate Analyzed: 01-18-89

ompound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	ug/kg
-Chlorophenol	330	ND	
-Nitrophenol	330	ND	
henol	330	ND	
,4-Dimethylphenol	330	ND	
,4-Dichlorophenol	330	ND	
,4,6-Trichlorophenol	330	ND	
-Chloro-3-methylphenol	660	ND	
,4-Dinitrophenol	1600	ND	
,6-Dichlorophenol	*	ND	
-Methyl-4,6-Dinitrophenol	L 1600	ND	
entachlorophenol	1600	ND	
-Nitrophenol	1600	ND	
enzoic Acid	1600	ND	
-Methylphenol	330	ND	
- & 4-Methylphenol	330	ND	
,3,4,6-Tetrachlorophenol	*	ND	
,4,5-Trichlorophenol	330	ND	

Ellen Milla Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

OTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING-SCIENCE

THE PERSON

Contraction of the Contraction o

3

1821481 P. 8-24-88) 8-8-69 RESAMPLE CONGINGLESMOK Broken 8-5-88)
RESAMPLE CONGINGLESMOK Broken 8-6-88) 455 ample (Discord origisample 8-8-881) Original Sample broken 8-5 sti Resample (Discord original Sandie 8-08) 6010 Analysis Received by: (Signature) ×82252 ENGINEERING-SCIENCE RESAMPLE (CRIMINAL SAMPLE Broken LABORATORY, INC. RESAMPLE NO. ignel Sample Land Berkeley, CA. 94710 **887788** Resample (Baiginal Sauple be 600 Bancroft Way Barion REMARKS cold + inted SKIP TO DISCARD X82255 AII ō Date/Time Resample 882252 45 Note SOILS ANALYSES CHAIN OF CUSTODY RECORD THE SE Remarks (e.c. of REQUIRED TEPL TEILMS 1612 6 63 Relinquished by: (Signature) r₂ ر درع × X (3) 又 15:15 × 又 Date/Time OBGBMS K. Kg × OLCEMS 9.1.88 メ ہز × TAINERS Received for Laboratory by; (Signature) CON Š 9 Received by: (Signature) Bill Deaderson Duluth ANGB/Duluth, Mn. SAMPLE DESCRIPTION 55 I A DANGISG AWIO SSE DANGET AWAY SSI Date/Time SS M2 MW Sate/Time 553 DANGBEMWIH SSG PROJECT NAME/LOCATION 8:45 | MANG138 MW 20 55 DANGB8 MW 20 SSS 9131Ay 8:48 DANGGE MW 20 SS DANGBY MWIYSS 9 DANGISH MW 24 なえる BANGBEMMIY 8120 DANGES MWIY DANGIS 4 DAWGBY y: (Signature) Killnquished by: (Signature) SAMPLER(S): (Signature) त्र इ. 21.7887.45 07:00 30/17/2 8.45 0131 /84 8:20 50:01 1881 1878 8(31/88/10:05 20,0 TIME 50: 8/88/KIX Reting() shed ES JOB NO. **OR001** P/31/84 83/18/8 8/31/88 (8)31 kg 38/18/2 DATE

TIS	Service Conservation	CIDATE CONTRACT	Distraction	
Lab Code:	Case No. 922 SAS No.	The state of the s	SDG No.:	to a comment
Matrix: (soil/water	3/3/0/	Lab Sample	ID: 88082192-2	2203
Sample wt/vol:	30 (g/mL) <u>c</u>	Lab File I	D: <u>E5923</u>	
Level: (low/med)	1sw	Date Recei	ved:	_
* Moisture: not de	c	. Date Extra	icted: 9-10-8	3
Extraction: (SepF,	/cont/sono) <u>Senc</u>	Date Analy	zed: 10/20/88	
: GPC Cleanup: (Y/)	td	Dilution F	actor: /	
Number TICs found	: <u>8</u> (ug	CENTRATION UN /L or üg/Kg)	IITS: /kg	•
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	un Kirowa	4,55	.530	====:
1 2.		5,04	13000	
3		6,24	230	
·		<u> 23.96</u> 28.70	600	
[] []		128.78	770 J	
7.	1	33.14	7/0	
ε	Ż -	35,46	900	
- 9	e e Carriera de la carriera del carriera de la carriera del carriera de la carriera del la carriera del la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carriera de la carr	10 mm	٠٠٠ - ١٠٠ - ١٠٠ - ١٠٠	<u>- \ \ \ </u>
1 20				
11				
1 32				
1 32				
1 15.				
1 15.				
1 1				
17				

. .

20.

22.

24. 25. 25. 27. 23. 29. 30.

EPA SAMPLE NO.

SEMIVOL	ATILE	ORGAN	(ICS.	'ANALYS	31 5	DATA	SHEET
~~ (ENTATI	VELY	IDE	TIPLE), iCC	MPOU	ids

Endineering Science Contract: Lab Code: _____ Case No.: ____ SDG No.: _____ SDG No.: ____ SDG No.: ____ SDG No.: ____ SDG No.: ____ SDG No.: _____ _ _ SDG NO

Ratrix: (soil/water) Soil

Sample wt/wol: 30 (g/ml) gm

Level: @(lov/met) low

i Hoisture: not dec.____ dec.___

Extract.on: (SepF/Cont/Sono) Sono

GPC Cleanup: (Y/N) ✓ pH; ____

to Property

parameters of

Lab Sample ID: 880921042252 BLANK

Lab File ID: S0931

Date Received:

Date Extracted: 10-19-88

Dilution Factor:

CONCENTRATION UNITS: Number TIOs found: 14 (ug/L or ug/Tg) 113/Kg

			er!	
CAS NAMBER	באביסטאב אאפ	RT	DET. CONO.	Q ====
2	unknown	3,35 5,75 4,11	200	
:!		1 3,75	350	
3		4.71	1 270	
<u> </u>		1 4.61	/3:	İ
5		1 4.81	170	l
6		5,00	500	
7	<u> </u>	5.38	2500	
8		5.75	16000	!
9		6.99	570	! <i></i>
0.		26.0.6	7600	!
· - · _	•	26.46	230	
-2		28.79	830	!
-		29.57 34.37	2000	!
	V	34,37	3000	!
·				ļ
<u> </u>		!		<u> </u>
		!		!
				!
<u> </u>				!
20.		!		
21		!		!
²² ·].		!		!
23		!		!
24	·		ļ	!
25		!		!
26.	· · · · · · · · · · · · · · · · · · ·	!	<u></u>	!
27		<u> </u>		ļ
28				!
29		1		!
301			1	

FORM I SV-TIC

1/57 Rev.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

TE	NTATIVELY IDENTIFIED COMPOUN	IDS	DANGB-8	- 1
vame: Engine	case No.: 941 SAS No.:	ORADI		
Code:	Case No.: 941 SAS No.:		Job No.:	
ix: (soil/wate	r) <u>50,1</u>	Lab Sample	id: 8808225	<u> </u>
le wt/vol:	30 (g/mL) g		D: <u>E5943</u>	
:1: (low/med)	a		ived: 9-1-88	
isture: not de	dec		acted: 9-10-86	
action: (SepF	(/cont/sonc) Sonc	Date Analy	/zed: 10/21/8	2,
Cleanup: (Y/	(N) <u>W</u> (N'	Dilution 1	Factor: hone	
mber TICs found	# 3	NTRATION UI	/ /-	
CAS NULIBER	COMPOUND NAME	 RT = =======	 EST. CONC. ===========	Q
1	unknown	4.57	200	
2.	un known	175	1600	
3.	un Known.	5.6	23,000	
٠ - <u> ا</u>	un Linewa	6,25	700	·
5. 57-10-3.	huxadecanii acid	23.9%	930	
6	uninous	28.64	1500.	
7		25.88	170	
8	- Un Kirowa	33.06	900	¦
١	un fortun	35.50	9000	
~ · · · · · · · · · · · · · · · · · · ·	un From	_\	7000	¦
··		-¦	<u> </u>	ļ ———
<u> </u>			ļ	ļ
د . م		-		<u> </u>
·		_	·	<u> </u>
· · · · · · · · · · · · · · · · · · ·			ļ ————	¦
·		_	1	!
~ · —————		_		<u> </u>
<u></u>		_		¦
o .		_		¦
·		-		! ———
		_		ļ
-	5. - A	_ 	\ <u></u>	!
	!	-		!
·		{	<u> </u>	!
=		!		!
				!
7				
		_ -		
.0.		_		
·		_		
· · · · · · · · · · · · · · · · · · ·		_!		!

FORM I SV-TIC

10/86

(ug/L or ug/Kg) walka

1. 127-18-4		== ======	EST. CONC.	Q
^	tetrach/somethene	1.38		
2	imtnewn	1 4.49	20°c	
3	interoun.	4.75	1000	
4	un known.	5.12	21500	l
5.	unknown	6.27	730	
6. 57-10-3	hexadecanon acid	23.92	1000	
7.	un trom	28.44	1300	1
8	unknow	88 عد ا	13 C	
9.	unknown	30,33	21:0	
0	untroun	33.06	200	
	unknown	35.51	9.30	
. 4				
3.	· · · · · · · · · · · · · · · · · · ·			
4.	***************************************			
3.				
.6				
.7i		 ;		
.8				í —
.5.	**************************************			<u> </u>
0.				i —
				¦
			'	¦
3.			¦	¦
4.			!	¦
5.				!
			<u> </u>	
26			l	!
27.				ļ
28				ļ
29				

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EFA SAMPLE NO.

١	DANGB - 8-
	mw20-555

Les Name: Engineering Science Contract	:	mw20-555	_
Lab Code: Case No.: 94 SAS No.	: sDC 1	ic.:	
Matrix: (soil/water) Soil	Lab Sample ID:	88092252	_Rex
Sample vt/vol: 30 (g/mL) gm	Lab File ID:	50933	_
	Date Received:	9-1-88	
* Moisture: not decdec	Date Extracted:	12-19-88	
Extraction: (SepF/Cont/Sonc) Sonc	Date Analysed:	1/18/89	
GPC Cleanup: (Y/N) N pH:	Dilution Factor	:	

Number TICs found: 20

CONCENTRATION UNITS: (ug/L or ug/Eg)

				
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	[Q
1.	unknown	327	410	
2.		3.27	220	i — — i
3.		3.79	2200	i 1
4.	1	3.97	640	
5.		4.14	1800	i
6.	unknown alkene - moint, 98	7.09	8200	i ———
7.	unknown	5.04	820	i
8.		5.23	1/00	
9.		5,70	/2,000	i
10.		24,89	3/0	
11.	*	26.07	3700	
12.	i Table 1	26.47	280	i
13.		27.50	220	i ——
14.		28.94	226	i —
15.	1	29.54	3000	
16.		29.54 29.82	670	
17.		30.87	190	
16.		31.62	150	
19.			150	
20.		34.39	2 dev	
21.		i		
22.				
23		i		
24.		i	i	
25.		i	i	
26.		i	1	1
27.		i		1
28.	·	i ———		i ———
29	· · · · · · · · · · · · · · · · · · ·	i	'	i
30.	1	i	i	·
	1	i	·	i ——

FORM I SV-TIC

1/87 Rev.

QUALITY CONTROL RESULTS SUMMARY METALS

調がくく

於計模宣言

Terram array

ICP-S-0032-88

Sample Matrix:

Conc. Unit:

QC Report No:

10-28-88 9-01-88 mg/KG 5011

8.9

Dilution Factor:

\$Moisture:

Date Reported: Date Received:

ES Oak Ridge Bill Hayden **OR001** Job No.: Address: Client: Attn:

710 S. Illinois Avenue Suite F-103

Oak Ridge, In.

37830

Duluth ANGB Project: QC Report for Laboratory Sample No(s): 88092224-88092226 88092250-88092251

Laboratory Supervisor Approval:

Analyte	Laboratory	Sample Nos.	Date	Date	Anal	Blank	ā	uplicate	بغد		Spike #	ecovery		
	Duplicates	Spike	Anal	Prep	Me thod		ភ	ខ	RPD	SA	SR	SSR	PR	Notes
Barium	88092224	88092224	10-18-88	10-14-88	SW6010	6 50	44.5	39.4	12	220	44.5	210	75	**
Cadmi um	88092224	88092224	10-18-88	10-14-88	SW6010	<0.5	7.8	7.1	6	5.49	7.8	11.4	N99	_
Chromium	88092224	88092224	10-18-88	10-14-88	SW6010	¢1.0	34.6	29.5	17	22.0	34.6	54.2	68	
Lead	88092224	88092224	10-18-88	10-14-88	SW6010	<10	7.63	8.9B	K	54.5	7.6B	49.3	11	₹

1843

If \$ moisture is reported, results are presented on a dry-weight basis. NOTE:

Values for the following samples are reported from Furnace analysis: 88092226, 88092224,

See QC Report AAF-S-0036-88

See Legend attached,

NA = Not Applicable NC = Not Calculated ND = Not Detected = Concentration One = Concentration Two ខ X 100 $= \frac{C1 - cc}{(C1 + C2)/2}$ C1 - C2 Relative Percent Difference (RPD)

Percent Recovery (PR) = SSR - SR x 100

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

Constitution of the Consti

QUALITY CONTROL RESULTS SUMMARY METALS

ICP-S-0033-88 Soil	mg/KG 8-31-88 10-28-88 NA 8.1	sor Approval:
QC Report No:	Conc. Unit: Date Received: Date Reported: Dilution Factor:	Laboratory Supervisor Approval:
08001	ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Oak Ridge, Tn. 37830	Duluth ANGB
Job No.:	Glient: Attn: Address:	Project:

SC Report	t for Labora 8808; 8809; 8809;	υς Report for Laboratory Sample No(s): 88082200-88082203, 88092223-88092227 88092244-88092246, 88092248-88092249 88092252-88092255	o(s): 88092223 88092248	3-88092227 3-88092249			. D	Amet	•					
Analyte	Laboratory Duplicates	Analyte Laboratory Sample Nos. Duplicates Spike	Date Anal	Date Prep	Anal Method	Blank	C1	Duplicate C2	RPD	SA	Spike R SR	Spike Recovery SR SSR	R.	Not
Rarium Cadmium Chromium Lead	88082200 88082200 88082200	88082200 88082200 88082200	10-20-88 10-20-88 10-20-88 10-20-88	10-18-88 10-18-88 10-18-88	SW6010 SW6010 SW6010 SW6010	68.5 61.5 61.0	55.8 7.4 31.8 <10	52.6 8.7 37.3 <10	7 16 16 NC	218 5.4 21.8 54.4	55.8 7.4 31.8 <10	254 11.0 56.7 49.2	91 67N 114 90	¥

NA = Not Applicable NC = Not Calculated ND = Not Detected C1 = Concentration One C2 = Concentration Two = Concentration Two 001 X See Legend attached.

Real Relative Percent Difference (RPD) = C1 - C2

Relative Percent Difference (RPD) = C1 - C2

(C1 + C2)/2

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration) Percent Recovery (PR) = SSR - SR x 100

RE-A1-bullioner 1

S SUMMARY	!
RESULTS	_
CONTROL RESULTS	LETAL
QUALITY	

The second second

- Acceptance

Total Control of

Topomentino)

Processor 1911

elineturmotens

A STANDARD

Characterist

100
ORCO
**
2
Jop

ES Oak Ridge	Bill Hayden	710 S. Illinois
Client:	Attn:	Address:

AAF-S-0036-88	mg/KG 9-01-88 11-01-88 NA 8.9	
QC Report No: Sample Matrix:	Conc. Unit; Date Received: Date Reported: Dilution Factor:	

Laboratory Supervisor Approval:

Analyce	e Laboratory Sample Nos. Duplicates Spike	Sample Nos. Spike	Date Anal	Date Prep	Anal Blank Method	Blank	2	Duplicate C1 C2	PP CPS	45	Spike	Spike Recovery	1
										1	ng.	NSC.	F.
Lead	88092224	88092224	10-25-88	10-14-88 7421 <0.5 4.5 4.5	7421	<0.5	4.5	4.5	0	.5.49	±.5	5.49 4.5 14.8 188N	188N
1	•												
84													
5													

Notes

If & moisture is reported, results are presented on a dry-weight basis. See Legend attached. MOTE:

Relative Percent Difference (RPD) =
$$\frac{C1-C2}{(C1+C2)/2}$$
 X 100 C1 = Concentration One (C1 + C2)/2

一番の一番のでは、ことのではないないないないないからいないできましていることにいることにいることにはないないないないできません。

Job No.:	OR001		AAF-S-0035-88
Client: Attn:		Conc. Unit: Date Received:	mg/KG 9-01-88
Address:	Ivenue		See Notes
	Oak Ridge, In. 37830	Moisture:	8.9

QC Report for Laboratory Sample No(s):
88092244-88092246, 88092248-8809227
88092252-88092255, 88092227 Duluth ANGB Project:

Laboratory Supervisor Approval:

Analyte	Laboratorv	Sample Nos.	Date	Date	Anal	B1 ank	Ā	uplicate			Spike R	Spike Recovery		
	Duplicates Spike	Spike		Prep	Method		5	8	RPD	SA .	SR	SSR	æ	Notes
Arsenic	88092244	88092244	10-11-88 10-4-88	10-4-88	7060	<0.5	<5.0E <5.0E	<5.0E	NC	#8°#	4.84 2.42E	6.05	75* DF=10	F=10
Lead	88092244	88092244	10-20-88 10-4-88	10-4-88	7421	<0.5	6.6	11.6	16	6.05	9.9 16.3	16.3	106# 1	DF=NA
184	<i>:</i>													
6														

If % moisture is reported, results are presented on a dry-weight basis. See Case Narrative attached. NOTE:

NA = Not Applicable	NC = Not Calculated
C1 = Concentration One	(C1 + C2)/2
= C1 - C2 X 100	(c1 + c2)/2
Relative Percent Difference (RPD)	

ND = Not Detected SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration) Percent Recovery (PR) = SSR - SR x 100

QC-FRMONS

; }

1.1		; ; ;						
Country 14 1.	TPH-S-0075-88 Soil	•	-88	-88	-88			. [0.00
Consequence of the consequence o	TPH-S-	mg/KG	9-22-88	9-23-88	11-02-88	¥	ΨN	4
* * * * A * * * * * * * * * * * * * * *	•	, •,		**	••	or:		7
งและตอบสอบสอบสอบสอบสอบสอบสอบสอบสอบสอบสอบสอบสอ	QC Report No: Sample Matrix:	Conc. Unit:	Date Prepared:	Date Analyzed:	Date Reported:	Dilution Factor	:nre:	To be a second of the second o
QUALLIX LUMIKOL RESULLS SUMMARKS ENVIRONHENIAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS	QC Rep	Conc. Unit:	Date F	Date /	Date F	Diluti	Moisture	
					_			
The foundation of the state of			Avenue		37830			
Lucerii Hinngangered		ES Oak Ridge	llinois	103	. In.			ICB
production reserved	OR001	Oak R	10 S. 11	ifte F-	sk Ridge)		Duluch ANGB
\$ -50,000 Per 1,0	ö	M S	ā 7	ัง	ŏ			<u>,</u>
De Vestosca A	Job No.:	Client:	Attn: Address					Project:
ラ・2点270 ラ・2点270 ラ・2点270	Job	517	Accni	!				Pro

のなが、

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s): 88092223-88092227

88092244-88092255

Laboratory Sample No.	Anal Method	Blank	SR	SA	MS	PR	MSD	æ	RPD	Notes
B1 ank	418.1	<10	8.6J	39.5	38.5	76	37.5	73	ĸ	*
1847										

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

- See Legend attached.
- The reporting limit for the sample in this batch is provided by the sub-contract laboratory.

MS = Spike Sample	MSD = Spike Duplicate
X 100	
MS - MSD	(MS + MSD)/2
(RPD) =	
Difference	1
elative Derrent) ,
ρ	5

Percent Recovery (PR) = SSR - SR x 100

SR = Sample Result	Santra
	ç
Result	1 222
Sample	1 212
Ħ	1
SR	Č

NA = Not Applicable NC = Not Calculated ND = Not Detected

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

最高のできななながられている

OR001 Job No.: ES Oak Ridge Client:

710 S. Illinois Avenue Bill Hayden Address:

Attn:

Suite F-103

37830 Oak Ridge, In.

Duluth ANGB Project: QC Report for Laboratory Sample No(s) .: 88082244-88082254

VGC-S-0049-88 9-13-88 10-26-88 9-01-88 ug/KG 8011 Dilution Factor: Date Reported: Sample Matrix: Date Received: Date Prepared: Date Analyzėd: QC Report No: Conc. Unit: # Moisture:

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	MS	P.B.	MSD	E	RPD	RPD	QC Limits &Recovery
	Halocarbons: 8010						- Cust -			
88082244	1.1-dichloroethane	12.1	<u>8</u>	10.6	88	1 10.1	83	2	50	58-124
	Trichloroethene	12.1	QN -	11.5	95	12.2	101	9	16	75-110
· £	Chlorobenzene	12.1	QN -	11.3	93	11.9	86	2	21	71-125
1	Aromatics: 8020					و شوده				
8 naccanage	## ## ## ## ## ## ## ## ## ## ## ## ##	12.1	2	10.9	06 	12.1	100	2	1 26	75-123
	Toluene	12.1	2	10.9	1 90	12.1	100	5	16	79-115
3	Chlorobenzene	12.1	2	10.6	88	11.7	16	6	72	82-112

NOTE: If \$ moisture is reported, results are presented on a dry-weight basis.

x 100 (MS + MSD)/2 MS - MSD Relative Percent Difference (PR)

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MSD = Spike Sample Duplicate MS = Spike Sample

SR = Sample Result
SA = Spike Added (Concentration)

Not Applicable Not Calculated Not Detected

OC-FRM3S

METHOD BLANK SUMMARY

The state of the s

西北 の 大学

STANDARD A

のはのないのであることではないます。 こうしょうしょく

S ASSESSED

Constitution 1

THE PARTY OF THE P

Biomocopporting

A SAMPRESSIBLE

Characterism)

Total Manager

GH DOMERNITA NAMES

OR001 Job No:

Client: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, In. 37830

Sample Matrix: Conc. Unit:

Date Reported:

Soil ug/Kg 10-26-88

Laboratory Supervisor Approval:

Duluth ANGB Project:

File ID	Date Analyzed	Fraction	Instru- ment ID	CAS	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.	
	9-13-88	NGC	Vocol	75-09-2	Dichloromethane Benzene	1.31	0.25	88082244-88082250	
18 49									

- Company of the second

OR001 Job No: Client: Attn:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Address:

37630 Oak Ridge, In.

Duluth ANGB Project:

Sample Matrix: Conc. Unit:

Date Reported:

Sof1 ug/Kg 10-28-88

Laboratory Supervisor Approval:

File ID	Date Analyzed	Fraction	Instru- ment ID	CAS Number	Compound (HSL, TIC or Unknown)	Conc	CRDL	Inclusive Sample Nos.	
V52	9-12-88	NGC	Vocol	75-09-2	D1chloromethane Benzene	1.3	0.25	88092250	
c92	9-13-88	NGC .	Carbopack	75-09-2	Dichloromethane 1,3-Dichlorobenzene	2.5	0.25	88092251-88092255 88092256	
1850									
	,								

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

機関語を対するアンス人でようない。

OROO1

QC Report No.:

OCP-S-0035-88

Client:

ES Oak Ridge

QC Sample No.:

88082158

Attn:

Bill Hayden

Level (Low/Med): Low Date Reported:

11-10-88

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

37830

Project:

Duluth ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s).:

88082156-88082163 88082186-88082188 88082250-88082254 MINBUSTO

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS %	QC Limits Rec.
Lindane	3060	ND	113	111	46-127
Heptachlor	3060	ND	97.1	95	35-130
Aldrin	3060	ND	138	135*	34-132
Dieldrin	7640	ND	367	144*	31-134
Endrin	7640	ND	346	135	42-139
4,47-DDT	7640	ND	398	136*	23-134

	MSD Conc.	Ven «	MS %	%	QC L	mits
	In Extract (ug/Kg)	MSD % Rec. #	Rec. #	RPD #	RPD	REC
Lindane	94.9	93	111	17	50	46-127
Heptachlor	113	110	95	15	31	35-130
Aldrin	121	118	135*	13	43	34-132
Dieldrin	344	135*	144*	6	38	. 31-134
Endrin	329	129	135*	5	45	42-139
4,47-DDT	321	126	156*	21	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

STATE OF THE PERSON NAMED IN COLUMN 1

RPD: 0 out of 6 outside limits

Spike Recovery: 5 out of 12 outside limits

^{*} Values outside of QC limits

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERT SOIL

b No:

OR001

QC Report No.:

OCP-S-0035-88B

lient:

ES Oak Ridge

QC Sample No.: Blank

ttn:

Level (Low/Med): Low

ddress:

Bill Hayden

710 S. Illinois Avenue Suite F-103

Date Reported: 11-10-88

Oak Ridge, Tn.

37830

roject:

Duluth ANGB

Laboratory Supervisor Approval:

C Report for Laboratory Sample No(s).:

88082156-88082163 88082186-88082188 88082250-88082254

awbygo	
7.7	

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2000	ND	55.5	83	46-127
Heptachlor	2000	ND	45.1	68	35-130
Aldrin	2000	ДД	72.6	109	34-132
Dieldrin	5000	ND	259	156*	31-134
Endrin	5000	ND	236	142*	42-139
4,47-DDT	5000	ND	232	139*	23-134

	MSD Conc.	V05 #	V0. "		QC Lin	nits
	In Extract (ug/Kg)	MSD % Rec. #	MS % Rec. #	% RPD #	RPD	REC
Lindane	68.4	103 ,	83	21	50	46-127
Heptachlor	46.2	69	68	2	31	35-130
Aldrin	75.9	114	109	4	43	34-132
Dieldrin	302	181*	156*	15	38	. 31-134
Endrin	272	163*	142*	14	45	42-139
4,4~-DDT	258	155*	139*	11	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 6 outside limits

Spike Recovery: 6 out of 12 outside limits

^{*} Values outside of QC limits

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: OCP-S-0035-88
QC REPORT NO.: OCP-S-0035-88B

Analysis of matrix spikes samples resulted in high recoveries for aldrin, dieldrin, endrin and DDT. Analysis of spiked blanks showed high recoveries for the same compounds. The RPDs were good in both cases. The data related to these analyses were closely examined. No errors or problems were found.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

1853

88-A1-DULU0465 1

CN-FRM01

PESTICIDE METHOD BLANK SUMMARY

Job No.:

ORO01

Lab Name:

Engineering Science

Lab Sample No.: Blank

Client: Attn:

ES Oak Ridge

Bill Hayden

Matrix:

Soil

Address:

710 S. Illinois Avenue

Level (low/med):

Low

Suite F-103

37830

Extraction:

Sonc

Oak Ridge, Tn.

(SepF/Cont/Sonc): Date Reported:

11-11-88

Project:

Duluth ANGB

Date Extracted:

9-07-88

Date Analyzed (1): 10-4-88

Time Analyzed (1): 20:38

Instrument ID (1): 5890 #2

Date Analyzed (2):

Time Analyzed (2):

Instrument ID (2):

GG Column ID (1): OV-1

GC Column ID (2):

This Method Blank applies to the following samples, MS and MSD.

EPA Sample No.	Lab Sample ID (1)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2
_	88082156	10-04-88		
-	88082157	10-04-88		
-	88082158	10-05-88		
-	88082159	10-05-88		
-	88082160	10-05-88		
-	88082161	10-05-88		
-	88082162	10-05-88		
-	88082163	10-05-88		
-	88082186	10-05-88		
-	88082187	10-05-88		
-	88082188	10-05-88		
-	88082250	10-05-88		
-	83082251	10-05-88		
	88082252	10-05-88		
-	- 88082253	10-05-88		
				•

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

競技者を含めなかがない。こち・1 - 154・1 - 1 - 1 - 1 - 1

STATE OF THE PARTY

- News Co

では、これに

The state of the s

BNA-S-0083-88

09-01-88 09-10-88 10-21-88 03-09-89

Date Prepared:

Date Analyzed: Date Reported:

Date Received:

Conc. Unit:

ug/KG 3011

Sample Matrix:

OC Report No:

710 S. Illinois Avenue ES Oak Ridge Bill Havden Suite F-103 **OR001** Job No.: Address: Client: Attn:

Oak Ridge, In.

Duluth ANGB

Project:

88092257, 88092258, 88092244-88092252, 88092336, 88092338 (C Report for Laboratory Sample No(s):

Laboratory Supervisor Approval:

Dilution Factor:

ZMoisture:

Fraction	Compound	SA .	SR	MS	PR	. MSD		.RPD.	EPA RED	QC Limit ZRecavery
	1.2.4-Trichlorobenzene	4020	ON .	2250	56	2410	09	7	23	38-107
B/N	Acenaphthene	4020	£	2770	69	2690	29	6	61	31-137
Laboratory	2.4-Dinitrotoluene	4020	£	3330	83	2970	74	11	47	28-89
Sample #	Pyrene	4020	£	3490	87	3250	81	7	36	35-142
88092244	N-Nitroso-di-n-Propylamine	4020	£	3900	97	3780	94	٣	38	41-126
		4020	§	1360	34	1410	35	9	27	28-104
55	Pentachlorophenol	8030	E	4860	09	4100	51	16	47	17-109
S acro	Phenol	8030	£	2660	70	5300	99	9	35	26-90
Laboratory	2-Chlorophenol	8030	£	4860	09	4740	59	2	S	25-102
Sample #	4-Chloro-3-Methylphenol	8030	£	7670	95	6950	98	01	33	26-103
88092244	4-Nitrophenol	8030	Q.	8270	103	7030	87	17	20	11-114
NOTE: If Z	NOTE: If % moisture is reported, results are pres	ire presented	on a	dry-weight	basis.					

X 100 (MS + MSD)/2MS - MSD Relative Percent Difference (RPD)

MSD = Spike Duplicate SR = Sample Result SA = Spike Added (Cor MS = Spike Sample

Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

Percent Recovery (PR) = $(MS \text{ or } MSD) - SR \times 100$

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0003-89

12-07-88 12-16-88 01 - 05 - 8902-23-89

Date Received: Date Prepared: Date Analyzed: Date Reported:

ug/KG Soil

Sample Matrix:

Conc. Unit:

OC Report No:

OR001 Job No.: ES Oak Ridge client:

710 S. Illinois Avenue Bill Hayden

Address:

Attn:

Oak Ridge, In.

Suite F-103

37830

Laboratory Supervisor Approval:

Dilution Factor:

*Moisture:

Project:

Duluth ANGB

Laboratory Sample No(s): 88082104Re QC Report for

88092252Re

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit \$Recovery
	1,2,4-Trichlorobenzene	3970	ND	3480	88	3660	92	נט	23	38-107
B/N	Acenaphthene	3970	N Q	3230	81	3290	83	7	19	31-137
Laboratory	Laboratory 2,4-Dinitrotoluene	3970	2	2140	54	2160	54	H	4.7	28-89
Sample #	Pyrene	3970	8	4010	101	4290	108	7	36	35-142
88123297	N-Nitroso-di-n-Propylamine	3970	8	2690	89	2760	70	m	38	41-126
18	1,4-Dichlorobenzene	3970	ND	2960	75	2850	72	4	27	28-104
35	Pentachlorophenol	7940	ND	7300	92	8650	109	17	47	17-109
ACID 9	Phenol	7940	ND	6110	77	6350	80	4	35	26-90
Laboratory	2-Chlorophenol	7940	Q	5000	63	5160	65	m	20	25-102
Sample #	4-Chloro-3-Methylphenol	7940	QN	4840	61	5160	65	9	33	26-103
88123297	4-Nitrophenol	7940	QN	7380	93	7340	92	ત	20	11-114

If % moisture is reported, results are presented on a dry-weight basis. The quality control sample for this batch is from a different project.

MS = Spike Sample WSD = X 100 (MS + MSD)/2MS - MSD " Relative Percent Difference (RPD)

Spike Duplicate Sample Result

NO * Spike Added (Concentration)

NA = Not Applicable

Calculated Detected

Not Not

Percent Recovery (PR) = $(MS \text{ or } MSD) - SR \times 100$

89-DULU0840 1

の一般のないないできない こうしゅう かんしゅう かんしゅう かんしゅう かんしゅう

parameters,

Total September 1

шировационали

OR001 Job No:

and the first contract of the householders and the second of the contract of

Allowed many of the control of the c

Client: Attn: Address:

ES Oak Ridge Bill Hayden 710 S. Illinois Averue Suite F-103

37830 Oak Ridge, In.

Duluth ANGB

Project:

Work Order No(s).: 932/941

Conc. Unit: Date Reported: Sample Matrix:

SOIL ug/KG 03-09-89

Laboratory Supervisor Approval:

Inclusive Sample Nos.	88082192-88082203	88092252 (REX)		
CRDL		ı		
Conc	ı	ı		
Compound (HSL, TIC or Unknown)	NONE DETECTED	NONE DETECTED		
CAS	ı	I		
Instru-	2	-		
Fraction	BNA	BNA		
Date	10-20-88	01-18-89		X BLANK
File ID	E5923	S0931	1857	S0931 = REX BLANK

C ()784.02 (1)73

SEMIVOLATILE METHOD BLANK SUMMARY 4B

Job No.:

Client: Attn: Address: Work Order No.:

Lab Sample No.: 04-48 Lab File ID: So931 Matrix: So, 1

Level (low/med):

Date Analyzed: /-18-89

Time Analyzed: 12:44 Instrument ID:

Date Reported:

Project: Dulth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
ANGB - 3 - MW27 - SS3	188082104 Rex 1	50932	1-18-89
E22 - 06 WM - 8 - 8 DNA	18109252 Pex 1	50933	1-18-89
			<u> </u>
-			
•			
	<u> </u>		
			1

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: Engineering Science

Client: Attn: Address: Job No.: Project:

File ID: >T0118

DFTPP Injection Date: 1/18/89 DFTPP Injection Time: 9:21

Date Reported: Instrument ID: 1

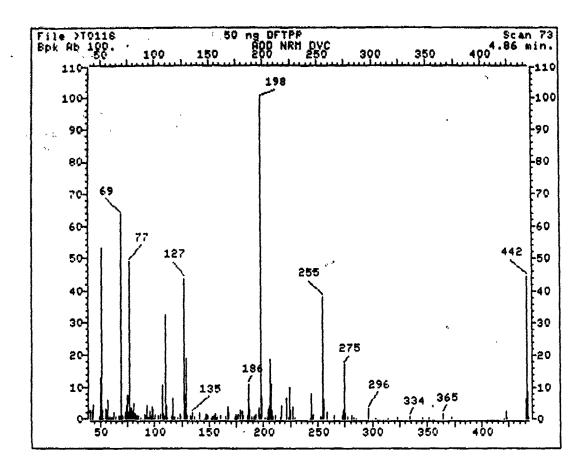
m/e	ION ABUNDANCE CRITERIA	% RELA ABUNI	
•	30.0 - 60.0% of mass 198	53,3	1.3)1
69	Mass 69 relative abundance	63.6 1.1(·
1 197	40.0 - 60.0% of mass 198	43.7	
1 199	Base Peak, 100% relative abundance	100.0	
365	10.0 - 30.0% of mass 198	17.2	
442	Present, but less than mass 443	6.1	19.4)2
1 223	1-Value is % mass 69 2-Value is % mass 69		<u> </u>

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
			= = = = = =
01 80 mg/L BNA STD + IS	>S0928	1/18/89	9:41
02 88123522 AC 1ml	>50929	1/18/89	1 10:45
03 88123522 BN 1ml	>50930	1/18/89	11:44
04 88092104,2252 REX BL	>50931	1/18/89	1 12:44
05 88092104 REX 1ml	>S0932	1/18/89	13:44
06 88092252 REX 1ml	>50933	1/18/89	14:45
07 88092535 REX AC 1ml	>50934	1/18/89	15:44
08 88092535 REX BN 1ml	>50935	1/18/89	16:43
09 88113123 10ml	>50936	1/18/89	17:42
10 88113122 10ml	>50937	1/18/89	18:41
11 88113122 MS 10ml	>50938	1/18/89	19:41
12 88113122 MSD 10ml	>50939	1/18/89	20:41
13		l	
14 j		l	1
15		l	I
16		I	1
17		l <u></u>	l
18		l	II
19	_1	l	1
201	_1	l <u></u>	
21		1	
22		1	

1859 FORM V SV

1/87 Rev



Files	STATIO	Scan #:	73	Retn. time:	A Q A
1115.	\IVIIO	308N #*	()	KEIN. TIME:	4.00

m/z	Int.	m/z	Int.	m/z	Int.	m/z	Int.	m/2	Int.
41.10	2.784	82.00	1.745	127.15	43.739	185.15	1.081	246.05	1.447
43.00	2.690	83.1)	1.609	128.05	3.686	186.15	11.033	253.15	.868
44.00	4.469	84.10	1.005	129.05	19.111	187.05	3.158	254.05	.289
46.50	. 238	85.00	1.124	129.95	1.319	188.95	.681	255.05	38.061
49.20	.928	86.00	.996	133.05	1.200	190.95	. 638	256.05	6.155
50.00	12.837	87.00	.494	133.95	.400	192.15	1.107	258.15	2.111
51.10	53.265	91.00	1.490	135.05	2.103	193.05	1.328	258.95	. 238
52.20	2.699	92.00	.272	137.15	.741	196.05	3.337	265.05	.936
52.90	. 196	93.00	3.984	141.15	1.924	196.85	.809	273.05	1.064
55.00	3.150	94.00	. 272	142.05	1.098	198.05	100.000	274.05	2.877
56.00	2.443	95.20	.409	146.15			7.117		
57.00	5.7 9 7	96.10	2.435	147.15	1.413	201.45	. 298	276.05	1.898
58.10	.341	97.20	.911	148.05	1.413	203.05	. 332	277.05	.749
59.20	. 375	98.10	3.822	149.15	1.047	204.05	3.099	281.15	1.124
60.20	,400	99.00	2.979	152.15	.221	205.05	4.282	283.05	. 272
61,10	.536	99.90	. 230	153.05	.749	206.15	10.822	285.15	. 230
62.10		101.10		154:05		207.05		296.05	
	1.949		1.090	155.05	1.234	208.15	2.665	296.95	
	.613			156.15			.698		
67.00		107.00		157.05		210.85		314.85	
	826			158.05		216.05		323.05	
69.00		109.00	.749	160.15		217.05		334.05	.792
	1.056		32.613	161.05		221.15		345.85	
	. 868	111.10	4.171	164.95			.724		
73.00	1.966	112.10	. 349	167.05	3.967	223.05		364.95	1.822
74 34									

		-							
/6.lu	4.441	110.10	.40)	1/2.02	1.461	441.43	3.711	447.10	6.711
76.20	.630	118.90	.732	175.95	.349	229.05	.494	424.00	.332
77.10	48.974	122.10	. 332	177.05	1.490	242.95	. 187	441.10	6.087
78.10	3.516	123.10	1.379	179.05	2.724	243.35	.230	442.10	44.513
79.00	3.337	124.10	.741	180.15	2.443	244.05	7.789	443.10	8.649
80.00	2.554	124.90	.596	181.05	1.107	245.15	.732	444.10	.383
A: 1A	A / 95								

- これの日本

T COLOR

Appropriate to the second

Case No:	Calibration Date: 01/18/89
Contractor: Evilinger, No Kicke	Time: 09:41
Contract No:	Laboratory ID: >50928
Instrument ID: 1	Initial Calibration Date: 10/45/88

Minimum RF for SPCC is

Maximum & Diff for CCC is &

Compound	RF	RF	101ff	CCC	SPCC
N-Nitroso-Dimethylamine	.90169	1.11679	23.85		
2-fluorophenol	1.15802	1.35674	17:16		
bis(2-Chloroethyl)ether	1.11892	1.15280	3.03		
Pheno l	1.41657	1.51102	6.67	*	
Pheno 1-d5	1.22488	1.26303	3.11		
Aniline .	.54193	.41789	22.89		
2-Chlorophenol	1.23175	1,39610	13.34		
1,3-Dichlorobenzene	1.47535	1.46115	.96		
1,4-Dichlorobenzene	1.40530	1.46709	4.40		
Benzyl Chloride	-	•	-		
Benzyl Alcohol	.72906	.77814	6.73		
1,2-Dichlorobenzene	1.32240	1.45231	9.82		
2-Methylphenol	1.17367	1.46743	25.03		
3-6-4-Methylphenol	1.07139	1.36567	27.47		
bis(2-chloroisopropyl)Ether	2.15627	3.18410	47.67		
N-Nitroso-Di-n-Propylamine	.84050	1.00595	19.68		# #
Hexach loroethane	.53840	.61224	13.72		
Dibromochloropropane	-	-	•		
Nitrobenzene	.40312	.46125	14.42		
Nitrobenzene-d5		.43795			
2-Nitrophenol	.24657	.28074	13.86	#	
Isophorone	.74170	.84116	13.41		
bis(2-Chloroethoxy)methane	.49386	.59520	20.52		
2,4-Dimethylphenol	.34849				
Benzoic Acid	.29725	.29254			
2,4-Dichlarophenol	.56733	.56513	. 39	*	
1,2,4-Trichlorobenzene	.36913	.35741	3.18		
Naphthalene	.94589	.96581	2.11		
4-Chloroaniline	.36309	.37816	4.15		
Hexach lorobutadiene		. 20495			
4-Chloro-3-Methylphenol	.31360	.35867	14.37	#	
2-Methy Inaphtha lene	.56397	. 60546	7.36		

RF - Response Factor from daily standard file at 80.00 mg/L

Form VII Page 1 of 3

RF - Average Response Factor from Initial Calibration Form VI

¹Diff - 2 Difference from original average or curve

ECC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

一般を受ける さんこう かんかん かんかん こうない かんしょう しょうしょう

Case No:		Calibr	ation D	te	01/18	/85	
Contractor! ENGINEERING S	Time: 09:41						
Contract No:	*****		tory ID				
Instrument ID: 4		Initia	l Calib	atio	n Dat	e: 1	0/13788
Minimum RF for SPCC is		Maxim	um 2 Di	if fo	r CCC	is	X
Compound	RF	RF	XDiff		SPCC		
Hexach lorocyc lopentadiene	.29568				11		
2,4,6-Trichlorophenol	.42280						
2,4,5-Trichlorophenol	.52897						
	1.27220						
	1.23784						
2-Nitroaniline	.47288						
	1.40629						-
2,6-Dinitrotoluene	.37415						
	1.68918						
3-Nitroaniline		.52351					
2,4-Dinitrophenol		.14039			**		•
Acenaphthene	1.13011						
Dibenzofuran	1.64131						
2,4-Dinitrotoluene		.24651					
4-Nitrophenol		.21784			**		
Fluorene	1.12850						
Diethylphthalate	1.20939						
4-Chlorophenyl-phenylether		.53215					
4-Nitroaniline		.36260					
2,4,6-Tribromophenol		.19466	7 41				
1,2-Diphenylhydrazine		-					
Alpha-BHC	-	_	· _				
Beta-BHC	_	-	-				
Gamma-BHC		-	_				
Delta-BHC	-	-	_				
Heptachlor	-	-	_				
Aldrin		-	_				
N-Nitrosodiphenylamine	.40286	.39967	.79				
4,6-Dinitro-2-Methylphenol	.10514	. 27787	//	-			
4-Bromopheny l-pheny lether		.25429					
Hexach lorobenzene		.28073					
Pentach loropheno l		.15470					

RF - Response Factor from daily standard file at 80.00 mg/L

KF - Average Response Factor from Initial Calibration Form VI

2Diff - 2 Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VII Page 2 of 3

Case No:		Calibration Date: 01/18/89 Time: 09:41					
Contractor: ENGINEERING - 50							
Contract No:	• '	Labora	tory ID	· >S0928	*********		
Instrument ID: 5	,,,,,,,	Initia	l Calib	ration Dat	e: 10.43788		
Minimum RF for SPCC is	•	Maxis	ium t Di	ff for CCC	is X		
Compound	RF	RF	ZDiff	CCC SPCC			
Phenanthrene	1.03431		7.32				
	1.05155						
Di-n-Butylphthalate		1.32663					
4,4'-Dibromobiphenyl	-	-	-				
Fluoranthene	1.19047	1.08330	9.00	#			
Heptachlor Epoxide	*	•	-		a ^y		
Endosulfan I	-	_	-				
4,4'-DDE	•	•	-		•		
Dieldrin	-	-	-				
Endrin	-	_	-				
4,4'-000		_	-		•		
Endosulfan II	•	-	-				
Endrin Aldehyde	-	-	-				
4,4'-DDT	-	**	-				
Endosulfan Sulfate	-	-	•				
Dibutylchlorendate	-	-	-				
Benzidine	.04023	.01443	64.14				
Pyrene		1.50017					
ferphenyl-dl4		1.13762					
Butylbenzylphthalate		1.01574					
3,3'-Dichlorobenzidine		.22432					
Chrysene			1.08				
Benzo(a)Anthracene		1.11191	.71				
bis(2-Ethylhexyl)Phthalate		1.24614	2.92				
Di-n-octylphthalate		3.09552	9.03				
Benzo(a)Pyrene		1.33075	.74				
Benzo(b)Fluoranthene		1.59981	.54				
Indeno(1,2,3-cd)Pyrene		1.06275	9.79				
Dibenzo(a,h)Anthracene	.87481	.96582	10.40				
Benzo(k)Fluoranthene	1.44370	1.42827	1.07				
Name (a. b. 110)	003/4	00770					

RF - Response Factor from daily standard file at 80.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

#Dift - # Difference from original average or curve

Benzo(g,h,i)Perylene

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

1.07

Form VII Page 3 of 3

.89761 .90720

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: Engineering Science

Client: Attn: Address: Job No.: Project:

File ID: >50928

Date Analyzed 1/18/89 9:41

Date Reported: Instrument ID:

	IS1(DCB)	<u> </u>	IS2(NPT)		IS3(ANT)	
	AREA #		AREA #	RT	AREA #	
*********	*****	****	******	*****	********	****
1 12 HOUR STD	168936.	8.94	613121.	12.56	389128.	18,00
UPPER LIMIT	337872.		1226242.		778256.	
*****	*****		*****	*****	*****	
LOWER LIMIT	84468.	ļ	306560.		194564.	
	*****	=====		=====	********	
SAMPLE						
NUMBER						
1 88123522 AC	172734.	8.92	580724.	12.51	317950.	47 0
2 88123522 BN	115195.	•	•	12.51	•	
3 88092104,225		8.91		12.49	•	17.90
4 88092104 REX		8.91	•	12.50	•	17.9
5 88092252 REX		8.92		12.49		17.9
6 88092535 REX	171827.	8.95	579058.	12.55	325736.	18.0
7 88092535 REX		•		12.54	•	,
8 88113123 10m		8.95	-		•	
9 88113122 10m				12.50	=	17.9
0 88113122 MS 1 88113122 MSD		8.92		12.51		17.98
2	183450.	8.92	661696.	12.50	346029.	17.97
3		! 				
4						
5						
6		l	l		l	
7!!		<u> </u>				
8		l				
9 0					<u></u>	
1						
2						

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d8

UPPER LIMIT = + 100%

of internal standard area.

LOWER LIMIT = - 50%

of internal standard area.

Column used to flag internal standard area values with an asterisk

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: Engineering Science

Client: Attn: Address:

lient:

Job No.: Project:

File ID: >S0928

Date Analyzed: 1/18/89

Date Reported: Instrument ID: 1

•	IS4(PHN)		ISS(CRY)		IS6(PRY)	
1	AREA #		AREA #		AREA #	
!	ANDA W		ANDA W			*****
12 HOUR STD	573948.	22.65	386198.	31.09	239564.	36.92
				*****	*******	
UPPER LIMIT	1147896.		772396.		479128.	
********		=====		****	*******	****
LOWER LIMIT	286974.		193099.		119782.	
		*****	******	*****	********	
SAMPLE						
NUMBER						
	****			*****	*******	= * * * = =
01 88123522 AC		•	•	31.08		
02 88123522 BN		22.68	•	31,09	•	36.97
03 88092104,225		22.62	-	31.05	•	36.87
04 88092104 REX		22.61	•	31.05	•	36.89
05 88092252 REX		22.64	•	31.06	•	•
06 88092535 REX		22.65	•	31.08	•	36.91
07 88092535 REX		22.66		31,10		-
08 88113123 10m	•	22.65	•	31,10	•	-
09 88113122 10m		22.62	•	31.06		
10 88113122 MS		22.63	•	31.07		-
11 88113122 MSD	490583.	22.63	237632.	31.08	90614.*	36.94
121		!	ļ 	ļ	<u> </u>	
131		ļ	!	ļ		
14		ļ <i></i>	1	<u> </u>		
15		<u> </u>	! <u> </u>	ļ ————	ļ <i></i>	
16		! 	<u></u>	[ļ	¦
171		<u> </u>	ļ	!		l l
18		!		! 		' !
19 20		<u> </u>	!		!	' I
	!	!	!	!	i	!
21 /		<u> </u>	1	! 	!	/
221	l	·	I 	· ———	·	· ———

IS4 (PHN) - Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal standard area.

LOWER LIMIT = - 50%

of internal standard area.

Column used to flag internal standard area values with an asterisk

DATA PACKAGE #30

This page intentionally left blank.

Job No.:

OROO1.00

Client:

ES Oak Ridge Bill Hayden

Attention: Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

Project:

Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8-09-88.

37830

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88081706	DANGB8-MW14-SS1	BA-I	8-08-88		9-07-88	
∮. 88081706	DANGB8-MW14-SS1	CD-I	8-08-88		9-07-88	
88081706	DANGB8-MW14-SS1	CR-I	8-08-88		9-07-88	
88081706	DANGB8-MW14-SS1	PB-F	8-08-88		9-16-88	
88081706	DANGB8-MW14-SS1	418.1	8-08-88	8-29-88	8-31-88	
88081706	DANGB8-MW14-SS1	MOIS	8-08-88		8-12-88	
88081706	DANGB8-MW14-SS1	8010	8-08-88		8-18-88	8-18-88
88081706	DANGB8-MW14-SS1	8020	8-08-88		8-18-88	8-21-88
88081707	DANGB8-MW14-SS3	8010	8-08-88		8-17-88	8-18-88
88081707	DANGB8-MW14-SS3	8020	8-08-88		8-17-88	8-18-88
88081708	DANGB8-MW14-SS8	BA-I	8-08-88		9-07-88	
88081708	DANGB8-MW14-SS8	CD-I	8-08-88		9-07-88	
88081708	DANGB8-MW14-SS8	CR-I	8-08-88		9-07-88	
88081708	DANGB8-MW14-SS8	PB-F	8-08-88		9-16-88	
88081708	DANGB8-MW14-SS8	418.1	8-08-88	8-29-88	8-31-88	
88081708	DANGB8-MW14-SS8	MOIS	8-08-88	•	8-12-88	
88081708	DANGB8-MW14-SS8	8010	8-08-88		8-17-88	8-18-88
88081708	DANGB8-MW14-SS8	8020	8-08-88		8-17-88	8-18-88
88081709	DANGB8-MW14-SS9	BA-I	8-08-88		9-07-88	
88081709	DANGB8-MW14-SS9	CD-I	8-08-88		9-07-88	
88081709	DANGB8-MW14-SS9	CR-I	8-08-88		9-07-88	
1:88081709	DANGB8-MW14-SS9	PB-F	8-08-88		9-16-88	
88081709	DANGB8-MW14-SS9	418.1	8-08-88		8-31-88	
88081709	DANGB8-MW14-SS9	MOIS	8-08-88		8-12-88	
. 88081709	DANGB8-MW14-SS9	8010	8-08-88		8-17-88	8-18-88
88081709	DANGB8-MW14-SS9	8020	8-08-88		8-17-88	8-17-88

^{*} If applicable

Manufacture of the second

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88081706-88081709
WORK ORDER NO.: 819

These soil samples were received at the ES Berkeley Laboratory on 8-09-88. One 1L amber bottle for sample DANGB8-MW14-SS3 was received broken; all other samples were received cold and intact.

AMALYSIS REPORT

WORK ORDER NUMBER: 819

: ZB0000000440

APPROVED BY

PEPORT DATA:

S OAK RIDGE/DULUTH ANGB 10 S. ILLINOIS AVE. STE. 5103

OAK RIDGE, TN 37830

ALL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

DHTRACT / PO # : OROO1

CONTACT : BILL HAYDEN

(615)-481-3920

MSK: 2, UNITS: mg/kg

TEST COMPOUND	DANGBE-MW14-SS1 8-8-38 88081706	DANGB8-MW14-SS8 8-8-86 88081708	DANGB8-MW14-559 8-8-88 88081709
ID DIG SOIL	NA	NA	NA
ehelum	49.9	18.93	39.5
CAOMIUM	5.7*N	13.9*N	c.2*N
GROMEUM	24. 🗧	36.5	20.5
LEAD	9.15	3.58	5.38

ENGINEERING-SCIENCE INC. 10/06/88

PAGE 2

ANALYSIS REPORT

RK ORDER HUMBER:

819

E NUMBER FK ORDER DATE : 08/09/88

: ZB0000000440

:OFT DATA:

OAK RIDGE/DULUTH ANGB

0 3 ILLINOIS AVE STE. S103

₺ RIDGE. TH 57830

LL HAYDEN

CLIENT CATA:

ES OAK RIDGE/DULUTH ANGR (134)

710 S ILLINOIS AVE. STE. \$103

DAK RIDGE, TH 37850

SE REPORT COPIES: 1

mTRACT / FO # 1 0R001

: BILL BAYDEN

16:51-481-5920

564 3. UMITS: mgen6

TET COMPOUND	DANGB8-MV14-591	DANGBR-M¥14-853	0ANGB8-MW14-SS9
	9-8-89	8-8-66	8-8-88
	88091746	88081709	89081709
5.1 PETROLEUM HYDROCARBONS MOISTURE	100	15.1	<100 12.7

ANALYSIS REPORT

WORK ORDER NUMBER: 819

30B NUMBER : ZB0000000440 ### : ZB0000000440 ### : ZB0000000440

REPORT DATA:

S OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. 5103

OAK RIDGE, TN 37830

ILL HAYDEN

L. IENT DATA:

ES OAK RIOGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE, STE, S103

OAK RIDGE, TH 37830

OF REPORT COPIES: 1

₹CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4. UHITS: ug/Kg, GROUP 8010

Harding controllings	DANGB8-MW14-SS1 8-8-88		DANG88-MW14-SS8 8-6-88	DANGB8-MW14-SS9 8-8-88
TEST COMPOUND	88081706		88081708	
*				
ENZYL CHLORIDE	NO	NO	ND	ND
LIS (2-CHLOROETHOXY)METHANE BIS (2-CHLOROISOPROPYL)ETHER	NE	ND	ND	ND
BIS (2-CHLOROISOPROPYL)ETHER	ND	NO	NO	ND
ROMOBENZENE ROMODICHLOROMETHANE BROMOFORM ROMOETHANE ARBON TETRACHLORIDE	ND	ND	ND	ND
₹_ROMODICHLOROMETHANE	ND	GM	ND	NO
BROMOFORM	ND	NO	NO	NO
{ ROMOETHANE	ND	ND	ND	ND
AREON TETRACHLORIDE	ND	NO	NO	NO
Can nover the or nager	Mili	NO	NO	NO
* CAFOBUT	ND	ND GN	ND	ND
HLOROBENZENE	ND	ND	ND	NO
¹ CHLOROETHANE	ND ND ND	HO	ND	HD
CHLUKUFUKN	שמ	ND	NO	ND
-CHLOROHEXANE	ON	NO CH	NO	NO
I -CHLOROETHYL VINYL ETHER	NO	ND	ND	NO
CHLOROMETHANE	ND	ND	NO	NO
CHLOROMETHYL METHYL ETHER	ND	ND	ND	NO
TALOROMETHYL METHYL ETHER LOROTOLUENE	HD	ND	HD	ND
G I BROMOCHLOROMETHANE	ΝD	NO	ND	ND
DIBROMOMETHANE 2-DICHLOROBENZENE 3-DICHLOROBENZENE 1,4-DICHLOROBENZENE 3CHLORODIFLUOROMETHANE	ND	ND	ND	NO
.2-DICHLOROBENZENE	ND	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	NO	ND
1.4-DICHLOROBENZENE	ND	ND	ND	NO
₹ 3 CHLORODIFLUOROMETHANE	NO	ND	ND	ND
1-DICHLOROETHANE	ND	ND	ND	ND
1.2-DICHLOROFTHANE	NA	ND	NO	ND
ANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND
# ANS-1.2-DICHLOROETHYLENE	ND	ND	ND	ND
ឺប៉ះCHLOROMETHANE	138	3.0B	4.3B	3.0B
1,2-DICHLOROPROPANE	ND	ND	MO	ND

819

ANALYSIS REPORT FOR WORK ORDER NUMBER

	Dangb8-mW14-551 8-8-88	DANGB8-MW14-553 8-8-88	DANGB8-MW14-558 8-8-88	DANG88-MW14-SS9 8-8-88
-T COMPOUND	88081706	88081707	88081708	88081709

3-DICHLOROPROPYLENE	ND	ND	ND	NO
,2,2-TETRACHLOROETHANE	ND	ND	ND	ND
1.1.2-TETRACHLOROETHANE	ND	ND	NO	NO
FRACHLOROETHYLENE	ND	ND	ND	ND
1.1-TRICHLOROETHANE	ND	ND	ND	ND
2-TRICHLOROETHANE	ND	ND	ND	ND
ICHLOROETHYLENE	ND	ND	ND	ND
!CHLOROFLUOROMETHANE	ND	ND	ND	NO
1CHLOROPROPANE	ND	HD	NO	HD
YL CHLORIDE	NO	NO	ND	ND

ANALYSIS REPORT

VERK ORDER NUMBER: 819
OB NUMBER : ZB0000000
ADRK ORDER DATE : 08/09/88

: ZB0000000440

APPROVED BY

TEPORT DATA: S OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

gOAK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

1_ONTRACT / PO # : 0P001

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4. UNITS: ug/kg. GROUP 8020

TEST RAMPOUND	DANGB8-MW14-SS1 8-8-88 88081706	DANGB8-MW14-SS3 8-8-88 88081707	DANGB8-MW14-S58 8-8-68 8808:708	DANGE8-MW14-SS9 8-8-88 88081709
ENZENE	ND	NO	ND	ND
CHLOROBENZENE	NO	ND	ND	ND
',2-DICHLOROBENZENE	ND	ND	NO	ND
.3-DICHLOROBENZENE	NO	NO	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND
ETHYL BENZENE	NO	ND	NO	NO
OLUENE	1400	0.4	23	9.9
YLENES	ND	N0	N9	ND

CHAIN OF CUSTODY RECORD

ES JOB NO.	PROJECT NAME/LOCATION		SOILS ANAL	3ES
OR001	Duluth ANGB/Duluth, Mn.	NO.	REQUIRED	ENGIN
SAMPLER(S): (Signature)	Signatures Peter E Rimanomoi	CON		
DARE TIME	SAMPLE DESCRIPTION	TAINERS	12 cr 1 ms / s / s / s / s / s / s / s / s / s	REMARKS
8-8-48 0825	DANG B8-MW14-551	/		
5280 88.8-8	DANGE 8 - Mr.14 -551	/	X×××	SW6010 is for Burn and
8580 15.28	DANGB8 - MW14 - 553	/	×	
8-8-87 0858	DANGBE-MWI4-553	1.	* * * * * *	17 11
8-8-84 1207	DANG B8 - MU14 -558	_	×	
8-8-8 1207	DANGBY-MW14-558		メメメス	7)
8.3.13 0858		_		
8-8-35 0858	DANCES - MW14-559	\	メメメ	11
18				
76				
Relinquished by: (Signature)	S-8 3/ 1655	ture.)	Relinquished by; (Signature)	Date/Time Received by: (Signature)
Relinquished by: (Signature)	Date/Time Received for Labors (Signature)	tory by:	Date/Time Remarks	

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

Section's factor from the constitution of the	03.20	•	its fluore hamber (Ney Imperant) } }	nt/Phoe Na.		4710			Federal Express Use		_		Total Charges	PART CZOATZERSOO NEWSON MATE 1/26	
	P6-6-3-8	COPY	A Property Property	1	10.3	77	13		-1°	enceconditions on sequent See	2 24 2	s actual tags in the band in the current the technical technical to package, as used	Whe specified as a sound to the specified as a sound total t	Myster concess	
Section 1 feetwal Expense Account Number 19 1	PACKAGE TRACKING NUMBER		14. 14. 14.	1	Lance		FOLD FOR PICK-UP, Print FEDEX.		SEAVICE CONDITIONS, DECLAR	antificonstitues your agreement Service Guide which is	val not be responsible for any Clean in e- place, whether the next of their damage, du- the you specify a higher emount in the space	additional \$100 apocked and document you not of a chem. Adversary ambard breakons it break Express Service Gardin apply Young Person Express for business ambard and of the territories of each prince of the memory ambard of the	Siddle Pe	Federal C.	nder authorizes Faderal Express to d int without obtaining a delivery sign temnity and hold harmless Faderal Ex
Sendor's edoral Expense Account Namber Part Pa		\ \ \ 	To (Recipents	1	Exact Swar A				The secret		(1)	36. 26.	7	Station	۵
Sender's Federal Expense Account Number 196	AIRBILL 113 WITHWATER COUNTY 124 WITHWATER TO PRESE		(*151*)	Department/Floor No., J.	1 -		as will appear on invo		SHCHARTS.		VER WEEKDAY	TOPE	<u> </u>		FEDEX Corp
	CEL THE MAINLE FOR BOARD TO SEE THE PARTY OF	å	_		17		tion (first 24 characte		DELIVERY AND SPECU	1 NOLD FOR PREK	2 DELIYEN SATURDA	Coursian:	_ server		
	ALA I ALA	Express Account Number		" " "	5. 71/1	7	S - OO/	A DOOR HOUSE	SERVICES	1 -		-			
		Sander's Feder	From (Your N	Cumpany	Street Address	0			A	<u> </u>	2	LINKELD COERAGE] [<u> </u>	<u>پ</u>

- Strategiest

1877

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS ... EPA 8010/8020

VGC-S-0034-88

OR001 Job No.:

ES Oak Ridge Bill Hayden

710 S. Illinois Avenue Suite F-103

Address:

Client: Attn: 37830 Oak Ridge, In. Laboratory Supervisor Approval:

Dilution Factor:

Moisture:

Date Reported:

9-12-88

8-22-88

Date Analyzed:

8-10-88

ug/KG Soil

Sample Matrix:

QC Report No:

Date Received: Date Prepared:

Conc. Unit:

QC Report for Laboratory Sample No(s):

Duluth ANGB

Project:

1878

88081661-88081664, 88081706-88081709 88081692-88081700,

Laboratory Sample No.	Compound	. SA	SR	MS	PR	MSD	A.	RPD	RPD RPD	QC Limits #Recovery
	Halocarbons: 8010	44 De . CO			****					i. ! •
88081735	1,1-dichloroethane	11.3	85 10 10	9.73	1 86 1 81	9.81	87	~ ≈	202	58-124
	Irichloroechene Chlorobenzene	11.3	ND	9.47	#8	9.31	82	. 2	21	71-125
	Aromatics: 8020						######################################		·	
88081735	Benzene	11.3	GR.	10.1	1 89	10.2	06	-	56	75-123
	Toluene	11.3	12.96	11.2	173*	11.2	1 70%	∾ •	16	79-115
	Chlorobenzene	11.3	ĆR .	8.37	1.1.	8.31	(4x	0	(5)	2115

The quality control sample is from a different Martin Marietta project. NOTE: If # moisture is reported, results are presented on a dry-weight basis. See Case Narrative attached.

x 100 Relative Percent Difference (PR) = MS - MSD (MS + MSD)/2

- SR x 100 Percent Recovery (PR) = (MS or MSD) SA

MSD = Spike Sample Duplicate MS = Spike Sample

SA = Spike Added (Concentration) SR = Sample Result

Not Calculated Detected Not 1) 11 M S S

Not Applicable

Ħ

QC-FRM3S

88-A1-DULU0018 1

CASE WARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88081700, 88081706-88081707
QC REPORT NO.: VGC-S-0034-88

Samples 88081700 and 88081706 were analyzed initially as low soils. They were reanalyzed as medium soils due to the high acetone content. The results reflect the medium level analysis for acetone and the low level analysis for all other target compounds. Accordingly, both low and medium level blanks were required.

Sample 88081707 was lost after the 8240 analysis but before a monsture determination was done. Thus, the results are reported on a wet weight basis.

Percent recoveries for toluene and chlorobenzene in 8020 series do not meet the ES QC limits. Blank spike analysis shower the laboratory to be in control.

METHOD BLANK SUMMARY

連門課業でごう。

08001 Job No: Client:

Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, Tn. 37830

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/KG 10-06-88

Laboratory Supervisor Approval:

Duluth ANGB Project:

		- ~~ ~	
Inclusive Sample Nos.	88081700, 88081706	88081707-88081709	
CRDL	2.5	0.25	
Conc	7.8	5.5	
Compound (HSL, TIC or Unknown)	Dichloromethane	Dichloromethane	
CAS	75-09-2	75-09-2	
Instru- ment ID	Carbopack 75-09-2	Carbopack 75-09-2	
Fraction	DDA:	NGC	
Date Analyzed	8-17-88	8-17-8	~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~ ~~
File ID	c78	690	1880

QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS

いっている数数数数

PHINDEPHINES.

ATTRICE DESCRIPTION OF STREET

Annual services in

Laboratory Sample No.	Anal Method	Blank	SR	SA	MS	PR	MSD	PR	RPD	Notes	
88081692	418.1	.<100	< 100	1110	830	75	760	89	6	*	
, non dise											
18											
81											

	NA = Not Applicable NC = Not Calculated ND = Not Detected
on a dry-weight basis.	MS = Spike Sample MSD = Spike Duplicate
NOTE: If # moisture is reported, results are presented on a dry-weight basis.	* Percent recovery is within ES control limits. Relative Percent Difference (RPD) = MS - MSD X 100 (MS + MSD)/2
NOTE:	* Pe Relat

QUALITY CONTROL RESULTS SUMMARY METALS

AAF-S-0022-88	mg/KG 8-19-88	9-20-88 NA 12,2	
QC Report No: Sample Matrix:	Conc. Unit: Date Received:	Date Reported: Dilution Factor:	
OR001	ES Oak Ridge Bill Hayden	710 S. Illinois Avenue Suite F-103 Oak Ridge, In. 37830	
Job No.:	Client: Attn:	Address:	

Approval:	
Supervisor	
Laboratory	•

Duluth ANGB

Project:

QC Repor	t for Labora 88081	QC Report for Laboratory Sample No(s): 88081706, 88081708-88081709 88081749-88081754	3ample No(s): 88081708-88081709 88081749-88081754	0. #				DIMI	4					
Analyte	Laboratory Sample Nos. Duplicates . Spike	Sample Nos. . Spike	Date Anal	Date Prep	Anal Blank Method	Blank	2 D	Duplicate C1 C2 RPD	RPD	SA	Spike R SR	Spike Recovery SR SSR	PR H	PR Notes
Lead	88081706	88081706	9-08-88	8-19-88	7421	7421 <0.5 7.7	7.7	8.2	9	5.3	7.7	5.3 7.7 12.8 96	96	

1882

NA = Not Applicable	NC = Not Calculated	ND = Not Detected
= C1 - C2 X 100 C1 = Concentration One	C2 = Concentration Two	
X 100		
= C1 - C2	(c1 + c2)/2	
(RPD)		
Percent Difference		
e Percent		
Relative		

Percent Recovery (PR) =
$$SSR - SR \times 100$$
 SSR = Sp SR SSR = SA

QUALITY CONTROL RESULTS SUMMARY METALS

神聖がない。

1

(The statement of the s

ICP-S-0023-88	Soil mg/KG 8-08-88 9-20-88 NA	;
QC Report No:	Sample Matrix: Conc. Unit: Date Received: Date Reported: Dilution Factor:	
08001	ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Oak Ridge, Tn. 37830	
Job No.:	Client: Attn: Address:	

Project: Duluth ANGB

QC Report for Laboratory Sample No(s): 88081706, 88081708-88081709 88081749-88081754, 88081898-88081906

Laboratory Supervisor Approval:

1	
Notes	444
PR	78 46N 80
Recovery	228 9.3 42.8
Spike	49.9 6.7 24.6
SA	228 5.70 22.8
RPD	2 27* 10
Duplicate C2	49.0 5.1 22.3
2	49.9 6.7 24.6
Blank	<20 <0.5 <1.0
Anal Method	SW6010 SW6010 SW6010
Date Prep	8-23-88 8-23-88 8-23-88
Date Anal	9-07-88 9-07-88 9-07-88
Sample Nos. Spike	88081706 88081706 88081706
Laboratory Duplicates	88081706 88081706 88081706
Analyte	Barium Cadmium Chromium

1883

If # moisture is reported, results are presented on a dry-weight basis.

N See Legend attached.

* See Legend attached.

A See Case Narrative attached.

NA = Not Applicable NC = Not Calculated	<pre>ND = Not Detected tion)</pre>
$\frac{2}{\sqrt{2}}$ X 100 C1 = Concentration One $\frac{2}{\sqrt{2}}$ C2 = Concentration Two	ND SSR = Spiked Sample Result SR = Sample Result SA = Spike Added (Concentration)
Relative Percent Difference (RPD) = $\frac{C1-C2}{(C1+C2)/2}$ X 100 C1 = Concentration One (C1+C2)/2	Percent Recovery (PR) = SSR - SR x 100 SA

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

Samples No.: 88081706, 88081708-88081709

Samples No.: 88081749-88081754 Samples No.: 88081898-88081906 QC REPORT NO.: ICP-S-0023-88

The results obtained for the laboratory control sample (LCS) analyzed with these samples for the analytes Cadmium, Chromium and Barium exceeded the recommended EPA recoveries. All data associated with this batch was closely inspected and no analytical problems were found. The initial and continuing calibration verification standards and blanks and precision and accuracy recoveries were within acceptable limits with the exception of Cadmium.

The Cadmium spike recovery below acceptable limits was followed by an analytical spike as required by laboratory standard operating procedure. The results of the analytical spike indicate matrix interference for this analyte.

SEMIVOLATILE METHOD BLANK SUMMARY 4B

Job No.:

Client: Client ALtn:

Address:

Work Order No.:

Lab Sample No.: 03-50 Lab File ID: 50069

Matrix: Soil Level (low/med):

Date Analyzed: 9-16-88 Time Analyzed: /4:07

Instrument ID: Date Reported:

Project: Duluth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
LANGB8 - MW14 - SSI	88081706	ESSYI	8-30-88
	88081706N151	E5542	, ,
	88081706MSD	E5543	ţ i
DANGB2 - MW38 - 551	88081877	E5546	//
- MW38 - 550	88081878	E5547	17
- MW 38 - 554	88081879	E5548	1.
	BLANK MS	E5649	9-20-88
	BLANK MSD 1	E5650	
_			
	1		
			1
			ĺ

QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS

Job No.:	OR001		QC Report No:	TPH-S-0042-88	
Client: Attn: Address:	ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Oak Ridge, Tn. 37830		Sample Matrix: Conc. Unit: Date Received: Date Prepared: Date Analyzed:	Soil mg/KG 8-08-88 8-29-88 8-31-88 9-06-88	
Project:	. Duluth ANGB		Moisture:	10.1	*
QC Report	<pre>QC Report for Laboratory Sample No(s): 88081692-88081700, 88081706-88081708, 88081709</pre>		Laboratory Supervisor Approval:	or Approval:	•
Laboratory	Anal				

Laboratory Sample No.	Anal Method	Blank	SR	SA	MS.	PR	MSD	PR	RPD	Notes
88081692	418.1	< 100	< 100	1110	830	75	760	89	6	*
1886	•									

NOIL: If A moisture is reported, results are presented on a dry-weight basis.

	MS = Spike Sample	MSD = Spike Duplicate
* Percent recovery is within ES control limits.	Relative Percent Difference (RPD) = MS - MSD X 100	(MS + MSD)/2

Percent Recovery (PR) =
$$\frac{SSR - SR}{SA}$$
 x 100 SR = Sample Results Added

NA = Not Applicable NC = Not Calculated ND = Not Detected

SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS

SCHRIGGS, MAR

神経をからないか、 こしばしまるないこ しんしい

TOTAL STATE

Contract of

The second secon

TPH-S-0042-88B	SO11 mg/KG	NA	8-29-88	8-31-88	11-15-88
QC Report No:	Sample marrix: Conc. Unit:	Date Received:	Date Prepared:	Date Analyzed:	Date Reported:
			ne		30
OR001	ES Oak Ridge	Bill Hayden	710 S. Illinois Avenue		Oak Ridge, In. 37830
Job No.:	Client:	Attn:	Address:		

Project: Duluth ANGB

QC Report for Laboratory Sample No(s): 88081692-88081700, 88081706-88081708, 88081709

Milberto

Laboratory Supervisor Approval:

N N

Dilution Factor:

%Moisture:

	0	62	790	79	790	1000	<100	<100	418.1	Blank
Notes	RPD	PR	MSD	PR	MS	SA	SR	Blank	, Anal Method	Laboratory Sample No.

1887

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

MS = Spike Sample	MSD = Spike Duplicate	
100		
×		
MS - MSD X	(MS + MSD)/2	
II .		
(RPD)		
nt Difference (RPD)		,
Percent		
4		
Relative Perce		

Percent Recovery (PR) =
$$\frac{SSR - SR}{SA} \times 100$$
 SR = Sample Result SA = Spike Added (Concentration)

GC/MS TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFTPP)

Case No. AD-76

Contractor ENG SCI(9/7/88)

Contract No. 99-99-99

Instrument 10 #1

Date / Time 9/16/88 11:15

Lab ID >T0916::03

Data Release Authorized By:

m/2	1	ION ABUNDANCE CRITERIA		RELATIVE	ABUNDANCE
51	ا۔ ا	30.0 - 60.0% of mass 198		51.18 OK	<u> </u>
88	i	less than 2.0% of mass 69	İ	0.00 OK	(0.00) #1
69	i	mass 69 relative abundance	Ì	60.64	•
70	i	less than 2.0% of mass 69	ĺ	.59 OK	(.9747) #1
127	İ	40.0 - 60.0% of mass 198	j	42.36 OK	
197	İ	less than 1.0% of mass 198	i	0.00 OK	
198	i	base peak, 100% relative abundance	Ī	100.00 OK	
	-	5.0 - 9.0% of mass 198	į	6.37 OK	
275	i	10.0 - 30.0% of mass 198	•. j	20.01 GK	
365	i	greater than 1.00% of mass 198	. , i	2.14 DK	
441	-	present, but less than mass 443	i i	12.30 OK	
	-	greater than 40.0% of mass 198	i	87.91 OK	
	-	17.0 - 23.0% of mass 442	. ;	• • •	(19 94) #2

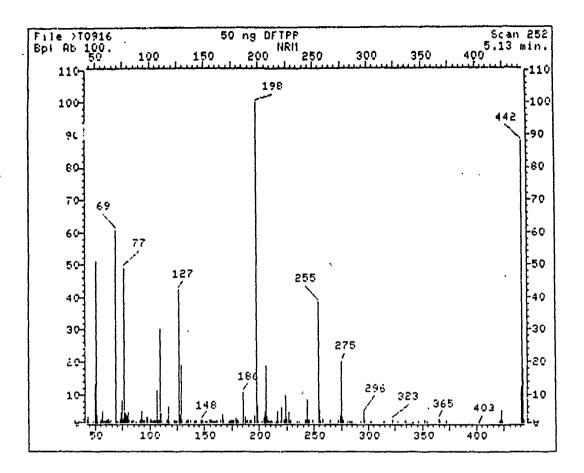
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS,

#1 - Value in parenthesis is % mass 69 $_{\circ}$

#2 - Value in parenthesis is % mass 442.

SAMPLE ID	LAB_ID	_ _DATE_OF_ANALYSIS_	TIME_OF_ANALYSIS
55TDC25	50067	9-16-88	11:40
BIK IMPLONIEW DOS	£ 0068	1	13:07
Bet 1706-09 977 74	50069		14:07
98081706	50070		1 16:12
SECETACE MY	- CONT 700	11	l
1		_	l
l		_	
1		_	l
	 		l
1	<u> </u>	<u> </u>	
<u> </u>			l
l <u></u> .			
<u> </u>			l
<u> </u>	<u></u>	_l	l
l	<u> </u>	_	l

3 P. X



File:	>10916	Scan #:	252	Retn.	time:	5.13
1						

to/z	in'.	m/2	Int.	tn/z	Inte	n/z	Into	n/z	Int.
43.00	.748	96.05	.615	148.85	.531	205.00	4.415	281.00	,495
44.00	2.847	97.15	.519	150.45	.157	206.00	18.661	282.80	. 265
45.00	.217	98.05	2.811	150.85	. 277	207.10	2.642	283.50	.145
48.90	.579	98.95	2.955	151.75	.470	208.00	.748	284.40	.133
50.10	13.329	100.15	,555	152.85	.458	209.00	.302	285.00	.543
51.00	51.182	101.05	2.195	153.95	. 881	210.00	.434	285.80	.145
52.10	3.329	102.15	.362	154.95	1.134	211.10	.893	292.90	.386
52.80	.217	102.95	.543	156.05	1.677	211.90	.398	295.85	4.439
55.10	1.134	104.05	,917	156.95	,446	214.80	.169	296.95	.724
56.00	1.435	105.05	1.604	157.75	.470	216.10	.495	301.95	.169
57.00	4.656	106.05	.507	158.95	.314	217.00	4.403	302.95	.543
57.90	.326	107.05	11.303	160.05	.350	218.00	.591	314.05	.362
58.80	.386	108.05	1.834	160.75	.760	219.70	. 265	314.75	.579
60.05	.326	109.05	.929	162.05	.543	221.00	5.766	323.05	1.809
61.15	. 856	.110.05	30.157	165.05	.772	222.10	.724	326.95	.555
62.05	.724	111.05	3.788	166.95	3.450	223.00	.965	334.05	.820
63.05	2.027	111.95	.398	167.95	1.556	224.00	9.409	334.95	.326
63.75	. 205	115.95	.712	171.95	.458	225.00	2.606	336.95	.193
64.95	. 808	116.15	.736	173.25	.277	226.90	4.139	340.85	.169
69.05	60.639	117.05	6.068	173.95	.760	227.90	.531	341.75	. 241
69.85	.591	117.95	.483	174.95	1.303	228.90	1.013	345.95	.483
71.05	.422	122.05	.808	175.95	.627	235.00	.314	351.95	.615
, 77 15	1.025	122.95	1.049	177.10				354.05	.446
95	4.005	123.85		179.00		238.90	. 229	354.85	.181
75.05		124.05		179.90		242.00		364.75	2.135
76.05	2.014	125.15	.772	181.00		243.10		365.85	. 290
77.05	49.180	127.05	42.364	181.80	.193	244.00	8.323	371.95	1.134

79.05	3.366	128.95	18.890	186.00	10.676	245.90	1.460	382.75	. 241
80.05	3.004	129.85	1.689	187.10	2.702	249.00	.627	389.95	.193
81.05	4.041	132.35	. 229	188.00	.374	255.00	38.444	401.75	.470
1 95	.784	133.95	. 603	189.00	.760	256.00	4.934	401.95	.495
605	1.411	134.95		191.00	.446	256.90	.277	402.85	.893
84.05	.446	135.85	.639	192.00	1.230	257.90	1.954	421.00	.555
85.05	.881	137.05	.844	193.00	1.049	264.70	.567	422.00	.712
87.05	.555	139.85	.253	196.00	3.136	265.00	. 688	423.00	4.656
88.25	.217	140.95	1.327	198.00	100.000	273.00	1.315	423.90	1.496
91.05	1.037	142.05	.881	199.00	6.369	274.00	3.293	441.00	12.304
92.05	.808	142.75	.410	200.20	.362	275.00	20.012	442.00	87.913
92.95	4.379	144.95	.217	202.90	.567	276.00	2.895	442.90	17.527
93.95		147.05	.977	204.00	2.557	277.00	1.327	444.00	1.821
95 A5	200	147 RS	1 012						

		HOL CO	mpounos	ì				i
	Case No:	,	Callbr	ation D	ate:	09/1	6/88	+ 432
(contractor: ENGINEERING	- SEIENGE	Time:	11:46				mee! (1
	Contract Ho:		Labora	tory ID	: >\$(067		
	Instrument 1D: 4		Initia	l Calib	ratio	in Da	te: 69/15/88 9/14/88	62
	Mininum RF for SPEC 1:	5	Maxim	um 2 Di	ff fo	or CC	C is 2	for CA62
	Campound	RF	RF	2Diff	CCC	SPCC		walsted I1 CI
	N-Mitroso-Dimethylamine	1.11526 1		4.99				updated I1 CI
	2-Fluorophenol	1.04191 1.		32.72				U
	bis(2-Chloroethyl)ether Phenol	1.45395 1		5.56				
	Pheno1-d5	1.57814 1.		13.40 24.11			. /	
	Aniline	1.29766 1.		4.17			/	
	2-Ehlorophenol	1.29000 1		12.66				
	1,3-Dichlorobenzene	1.33703 1.		14.89				
	1,4-Dichlorobenzene	1.26808 1.		14.30	Ŧ		•	
	Benzyl Chloride	-	-	-			•	
	Benzyl Alcohol	.45243	.00930	97.94				
	1,2-Dichlorobenzene	1.26918 1.		17.88				
	2-Methylphenol	1.07746 1.	.33777	24.16		•		
	3-6-4-Methylphenoi	1.00178 1.	21461	21.25			(Conc=50.00)	
(is(2-chloroisopropyl)Ether	3.21777 3.	24530	, 86			,	
	M-Mitroso-Di-n-Propylamine	1.20333 1.	17066	2.72		# #		
	Hexachloroethane	.53519 .	65973	23.27				
	Dibromochloropropane	•	-	-				
	Nitrobenzene	.47991 .	49073	2.25				
	Nitrobenzene-d5		43361	4.21				
	2-Nitrophenol		24165	10.31	•		•	
	Isophorone		93894	2.73				
	bis(2-Chloroethoxy)methane		57088	7.73				
	2,4-Dimethylphenol		33757	48.75				
	Benzoic Acid		22836	5.28				
	2,4-Dichlorophenol		30362	23.09	¥			
	1,2,4-Trichlorobenzene		36051	10.51				
	Haphthalene 4-Chloroaniline		95180	11.45		_		
	Hexachlorobutadiene		45071	4.50	_	•		
			21131	9.58				
	4-Chloro-3-Methylphenol 2-Methylnaphthalene		34565	19.92	•			
	r merny maphinatene	.49727 -,	54555	9.71		, .		

RF - Response Factor from daily standard file at 25.00 mg/L

Form VII Page 1 of 3

RF - Average Response Factor from Initial Calibration form VI

of - I Difference from original average or curve

⁻ Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Topics standard

	Case No:		Calibration Date: 09/16/88					
(Contractor: ENLINEEZANG -	Time: 11:46						
	Contract No:	Labora	tory ID	>\$0067				
	Instrument ID:	Initial Calibration Date: 09/27/88						
	Minimum RF for SPCE is		Maxim	um 2 Dii	ff for CCI	C is X		
	Compound	RF	RF	\Diff	CCC SPCC			
	Hexachlorocyclopentadiene	.31998	.40283	25.89	**			
	2,4,6-Trichlorophenol	.34057	.41058	20.56	ŧ			
	2,4,5-Trichlorophenol	.37168	.42289	13.78				
	2-fluorobiphenyl	1.03228	1.13969	10.41				
	2-Chloronaphthalene	1.10079	1.21103	10.01				
	2-Nitroaniline	.62664	.65766	4.95				
	Dimethylphthalate	1.30066	1.48378	14.08				
	2,6-Dinitrotoluene	.37641	,41472	10.18				
	Acenaphthylene	1.60416	1.89107	17.89		•		
	3-Mitroaniline	.66097	.66197	.15				
	2,4-Dimitrophenol	.20934	.23777	13.58	##			
	Acenaphthene	1.03503	1.16702	12.75				
	Dibenzofuran	1.40372	1.62595.	15.83				
1	² .4-Dinitrotoleene	.34782	.37435	7.63				
(Nitrophenal	,17238	.17962	4.20	f ¥			
	Fluorene	1.01979	1.15706	13.46				
	Diethylphthalate	1.02412	1.25075	22.13				
	4-Chlorophenyl-phenylether	.51416	. 65343	27,09				
	4-Nitroaniline	.51880	.54570	5.18				
	2,4,6-Tribromophenol	.21315	.36382	70.69				
	1,2-Diphenylhydrazine	-	-	•				
	Alpha-BHC	•	•	-				
	Beta-BHC	•	-	-				
	Gamma-EHC	•	-	-				
	Delta-BHC	-	-	-				
	Heptachlor	-		-				
	Aldrin	-		-				
	N-Hitrosodiphenylamine		.48204					
	4,6-Dinitro-2-Methylphenol		.18395					
	4-Bromophenyl-phenylether Hexachlorobenzene		.25111					
			.36177					
	Pentachlorophenol		.20372	16.72				
	RF - Response Factor from	daily st	andard fi	le at .	25.00 mg/	/L		
	RF - Average Response Fact	or from	Initial C	alibrat	ion Form (ni		
,	Züiff - Z Difference from ori	ginal av	erage or	curve				
(LCC - Calibration Check Com	pounds (•) SPC	c - sy	ystem Peri	formance Check Compo	unds (**)	

Calibration Date: 09/16/88 Case No: Time: 11:46 contractor: Laboratory ID: >50067 Contract No: Instrument 10: Initial Calibration Date: 49/1 Minimum RF for SPCC is Maximum & Diff-for CCC is & ŔF RF abiff ccc Spcc Compound N-Nitroso-Dimethylamine 1.11526 1.17094 4.99 2-Fluorochenol 1.04191 1.38286 32.72 bis(2-Chloroethyl)ether 5.56 1.45395 1,53480 Phenol 1.57814 1.78957 13.40 Phenol-d5 1.44681 1.79559 24.11 Aniline 1.29766 1.35176 4.17 2-Chlorophenol 1.29000 1.45328 12.66 1.3-Dichlorobenzene 1.33703 1.53610 14.89 1.4-Dichlorobenzene 1.28808 1.44939 14.30 Benzyl Chloride Cenzyl Alcohol 45243 ,00930 97.94 1,2-Dichlorobenzere 1.26918 1.49609 17.88 2-Methylphenol 1.07746 1.33777 24.16 3-6-4-Methylphenoi 1.00178 1.21461 21.25 (Conc=50.00) is(2-chloroisopropyl)Ether 3.21777 3.24530 .86 N-Nitroso-Di-n-Propylamine 1.20333 1.17066 2.72 Hexach lor oethane .53519 .65973 23.27 Dibromochloropropane Nitrobenzene .47991 .49073 2.25 Nitrobenzene-d5 .41608 .43361 4.21 2-Nitrophenol .21906 . 24165 10.31 Isophorone .91400 .93894 2.73 bis(2-Chloroethoxy)methane .52989 .57088 7.73 .22693 2,4-Dimethylphenoi .33757 48.75 Benzoic Acid .24110 .22836 5.28 2,4-Dichlorophenol .24667 .30362 23.09 1,2,4-Trichlorobenzene .32622 .36051 10.51 Naphthalene .85404 .95180 11.45 4-Chloroaniline .43129 .45071 4.50 He ach lorobutadiene .19284 .21131 9.58 4-Cnloro-3-Methylphenol .28823 .34565 19.92 2-Methy Inaphthalene .54555 49727 ŔF Response factor from daily standard file at 25.00 mg/L ii - Average Response Factor from Initial Calibration Form VI 20itt - 2 Difference from original average or curve

- Calibration Check Compounds (*)

Form VII Page 1 of 3

1894

SPCC - System Performance Check Compounds (**)

8B SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name	• <u></u>		···	Contract:		·	
Lab Code	•	Case No.:		SAS No.:	<u></u>	SDG No.	
EPA Samp	le No.(Stand	dard): 25mg	IL BNA	. 072	Date 1	Analyzed:	9/16/88
Lab File	ID (Standar	rd): <u>5</u> 0	067		Time I	Analyzed:	11:46
Instrume	nt ID:	,					
		IS1(DCB) AREA #	RT	AREA #	RT	IS3(ANT) AREA #	
	12 ·HOUR		9.35			156581	
-	UPPER			1		313,162	·
	LOWER LIMIT EPA SAMPLE	36,555		1	i	78,291	
02 03 04 05 06 07 08 09 10		73660 114970 67959	9.36	298074	12.96	17659 235142 162275	18.49 18.49
20 21 22							
IS2 (1	OCB) = 1,4-1 NPT) = Napht ANT) = Acena	chalene-d8		ir Lo	nternal DWER LI	MIT = + 100 $standard$ $MIT = - 505$ $standard$	rea.

'# Column used to flag internal standard area values with an asterisk

page __ of __

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name:			Contract:			
Lab Code:	Case No.:	••••	SAS No.:		_ SDG No.	
EPA Sample No. (Stan	dard): <u>25</u> m	glb BNA	072	Date 2	Analyzed:	9/16/88
Lab File ID (Standa	rd): <u>Sc</u>	067		Time I	Analyzed:	11:46
Instrument ID:						
	IS4(PHN)	<u> </u>	IS5(CRY)		IS4(PRY)	<u> </u>
	AREA #	•	AREA #	RT	AREA #	RT
======== 12 HOUR			2222222	=====		
sTD	296819		319388	31.63	341093	
UPPER			*L3P====		====================================	
LIMIT	593638	23.64	638,776	35.13	68 a,186	38.39
LOWER LIMIT	148410	22.64	159,694	31.13	170547	37,39
EPA SAMPLE NO.						
01 RLK (4)-64, (44-1700	298616	·	·			· · · · · · · · · · · · · · · · · · ·
02 15-K 174-09 1877-79 03 1 880817cw	287851	2317	286644	31.62	49375×	37.82 37.90
04 8808+706-m3		<u> </u>	2.6 9 6 7 7		 	27,70
05						
06						
08					<u> </u>	l
09						
10		1				
11						
13						
14						
15						
17						
18						
19						
20						
21						
IS4 (PHN) = Phena	nthrene-d	. '			AIT = + 100	
IS5 (CRY) = Chrys					nal standar	
IS6 (PRY) = Pery	lene-dl2	•			MIT = - 50% nal standar	

FORM VIII SV-2

Column used to flag internal standard area values with an asterisk

10/8

page __ of __

6C/MS TUNING AND MASS CALIBRATION

Decafluorstriphenylphosphine (DFTPP)

Case No. AD-76 Contractor EM6 SCI(9/7/88) Contract No. 99-99-99 Date / Time 9/20/88 12:19 Instrument ID #1 Jawa Kurk Lab ID >D0920::D1 Data Release Authorized By: 9/16 - Spoint i m/z i ION ABUNDANCE CRITERIA . XRELATIVE ROUNDANCE 1 51 1 30.0 - 60.0% of mass 198 47.26 OK 1 68 1 less than 2.0% of mass 69 1.12 OK (1.626) \$1 1 69 1 mass 69 relative abundance 68.77 1 70 | less than 2.0% of mass 69 0.00 OK (0,00) \$1 : 127 | 40.0 - 60.0% of mass 198 43.92 OK : 197 : less than 1.0% of mass 198 0.00 OK 1 198 | base peak, 100% relative abundance 100.00 OK 1 199 1 5.0 - 9.0% of mass 198 6.54 OK 1 275 | 10.0 - 30.0% of mass 198 20.95 OK 1 365 | greater than 1.00% of mass 198 1.13 OK 1 441 | present, but less than mass 443 8.50 DK 1 442 | greater than 40.0% of mass 198 61.39 DK : 443 : 17.0 - 23.0% of mass 442 11.69 OK (19.05) #2 11 - Value in parenthesis is X mass 69.

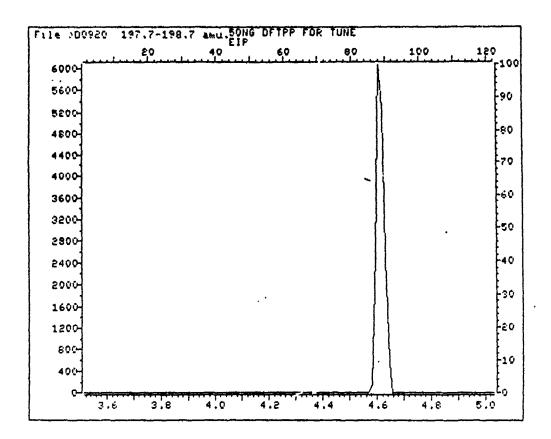
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

#2 - Value in parenthesis is X mass 442.

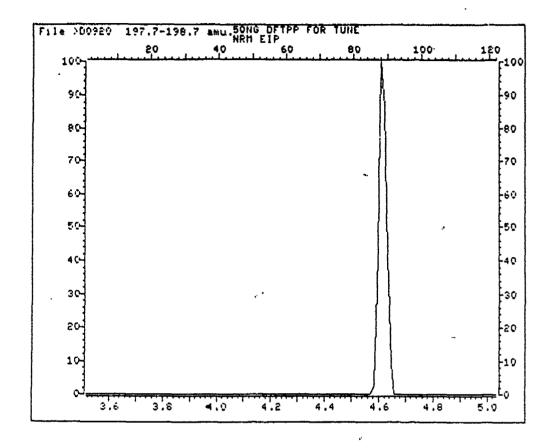
SAMPLE ID!	LAB_ID	_ _DATE_OF_ANALYSIS_!	TIME_OF_ANALYSIS	;
14801/706 BLK!	7ES65.1	9/20/88	15:54	1 *
" BUK MS!	>ES649		14.04	SSA
" BLK MUD!		J	14.59	1559
125mg/LABRU	> ES648		12:46	de la constant
7				
· · · · · · · · · · · · · · · · · · ·		1	' !	!
'''-		- <u>'</u> -	' 	!
<u>'</u> '.		······································	' <u></u>	,
<u>'</u> '-		- <u>'</u> ') 1
<u>'</u> '.		_i		i
<u> </u>].		_!		! -
\				1
<u> </u>		_		;
·		_	l	!
11			l	!
			<u> </u>	ļ

FORM U

7/85



tine	Int.	time	Int.	time	Int.	tine	Int.	tane	Int.
3.52	0.000	3.83	0,000	4,14	0.000	4,44	0.000	4.75	0.000
3.53	0.000	3.84	0.000	4.15	0.000	4.46	0.000	4.76	0.000
3,54	0.000	3.85	0.000	4.17	0.000	4,47	0.000	4.77	0,000
3.55	0.000	3.87	0.000	4.18	0.000	4.48	0.000	4.78	0.000
3.57	0.000	3.88	0.000	4.19	0.000	4,49	0.000	4.80	0.000
3.58	0.000	3.89	0.000	4.20	0.000	4.51	0.000	4.81	0.000
3.59	0.000	3.90	0.000	4.22	0.000	4.52	0.000	4.82	0.000
3.60	0.000	3.92	0.000	4.23	0.000	4.53	0,000	4.83	0.000
3,62	0.000	3.93	0.000	4.24	0.000	4.54	0.000	4.85	0.000
3,63	0.000	3.94	0.000	4.26	0.000	4.56	0.000	4.85	0.000
3.54	0.000	3,95	0.000	4.27	0.000	4.57	0.000	1.87	0.000
3,65	0.000	3,97	0.000	4.28	0.000	4.58	2.167	4.88	0.000
3.67	0.000	3,98	0.000	4.29	0.000	4.59	41.737	4.90	0.000
3,68	0.000	3.99	0.000	4.31	0.000	4.61	100,000	4.91	0.000
3,69	0.000	4.00	0.000	4,32	0.000	4,62	86.548	4.92	0.000
3.70	0.000	4,02	0.000	4.33	0.000	4.63	41.062	4.93	0.000
3.72	0.000	4.03	0.000	4.34	0.000	4.65	8,995	4.95	0.000
3.73	0.000	4.04	0,000	4,36	0.000	4.66	0.000	4.96	0.000
3.74	0.000	1.05	0.000	4,37	0,000	4.67	0.000	4.97	0.000
3.75	0,000	4,07	0.000	4, 38	0.000	1.68	0.000	4.98	0. 000
3,77	0.000	1.08	0.000	4, 39	0.000	4.70	0.000	5.00	0.000
3.78	0.000	4.09	0.000	4.41	0.000	4.71	0.000	5.01	0.000
3,79	0.000	4.10	0.000	4.42	0.000	4.72	0.000	5.02	0.000
3.80	0,000	4.12	0.000	1,43	0.000	4.73	0.000	5.03	0.000
3.82	0.000	4.13	0.000						



Case No:			Calibration Date: 09/20/88				
Contractor:	line:	Time: 12:46					
Contract No:		Labora	lory ID	: >E5648			
Instrument 10:		Initia	l Calib	ration D	ate: 09/19/68		
Minimum RF for SPEC is	;	Maxim	un I Di	ff for C	CC is X		
Compound	RF	RF	XD1ff	CCC SPC	C		
K-Kitrosn-Nine hylanine	.97318	. 93696	3.72		•		
	1,19718						
bis(2-Chloroethyl)ether	1.72380						
Phenol		1,63142					
Phenol-d5		1,44923					
Aniline		1.04746					
2-Chlorophenol		1.33499					
1,3-Dichlorobenzene		1,47278					
1,4-Dichlorobenzene	1,25213	1.39776	11.63	*			
Benzyl Chloride	•	•					
Benzyl Alcohol	.15892		-				
1,2-Dichlorobenzene	1.30329	1.38274	6.10				
2-Methylphenol	1.07027	1.05457	1.47				
3-6-4-Methylphenol	1.11935	1.29013	15.26		(Conc=50.00		
bis(2-chloroisopropyl)Ether	2.85694	2.15475	24.58				
N-Nitroso-Di-n-Propylamine	1.23303	. 95972	22.17	**			
Hexachloroethane	.58509	.58815	,52				
Dibromochloropropane	-	•	•				
Na trobenzene	.50051	.47067	5.96				
Hi trobenzene-d5	. 10361	. 39152	2.99				
2-Hitrophenol	.22074	.21501	2.60	•			
Isophorone	.89798	. 84593	5.80				
bis(Z-Chloroethoxy)methane	.49629	.50002	2.37				
2,4-Dinethylphenol	.34275	. 29399	14,23				
Benzeic Acid		.24180	14.48				
2,4-Dichlorophenol		. 30126		*			
1,2,4-Irichlorobenzene		. 32996					
Naphthalene		. 92740					
4-Chloroaniline		. 36196					
Hexachlorobutadzene	.18867	.19822	5.06	•			
4-Chloro-3-Methylphenol		.32830					
2-Methylnaphthalene	.49672	.53371	7.45				

RF - Response factor from daily standard file at 25.00 mg/L

form VII Page 1 of 3

RF - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Contractor:	Tine:					
Contract No:		Labora	tory ID:			
Instrument 10:		Imtia	l Calibr	atio	on Date: 09/	19/8
Maninum RF for SPCC is		Maxim	un I Dif	f fo	or CCC is I	
Compound	RF	RF	XDiff		SPCC	
Hexachlorocyclopentadiene	. 34256				**	
2,4,6-Irichlorophenol	. 31771	. 38174	20.15			
2,4,5-Trichlorophenol	.31050	.38174	22.95			
	1.02332					
2-Chloronaphthaiene	1.06734	1.13798	6.62			
2-Mitroaniline	.64844	. 56556	12.78			
Dinethylphthalate	1.15185					
2,6-Dinitrotoluene	,37240	.38297	2.84			
Acenaphthy) ene	1.43234	1.64883	15.11			
3-Witroaniline	.61164	.54950	10.16			•,
2,4-Dinitrophenol	.21222	.15711	25.97		**	
Acenaphthene	1.00882	1.12041	11.06	*		
Dibenzofuran	1.48405	1.49012	.41			
2,4-Dinitrataluene	.35416	, 34929	1.38			
4-Hitrophenol	.56574	.23117	59.14		**	
fluorene	1,16382	1.24422	6.91			
Diethylphthalate	1,29579	1.50905	16.46			
4-Chlorophenyl-phenylether	.47028	.54233	15,32			
4-Nitroaniline		.30634				
2,4,6-Tribromophenol		.17937				
1,2-Diphenylhydrazine	•	•	-			
Alpha-BHC	-	•				
Beta-PHC	-	•	-			
Ganna-BHC .		•	•			
Delta-BHC	-	-	-			
Heptachlor	•	-	-			
Aldrin		•				
N-Ni trosodiphenylamine	. 39351	. 47291	20.18	#		
4,6-Dinitro-2-Methylphenol		,15328				
4-Bramophenyl-phenylether		. 22530				
Hexachlorobenzene		. 29568				
Pentachlorophenol		.15933				

RF - Response Factor from daily standard file at 25.00 mg/L

PF - Average Response Factor from Initial Calibration form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VII Page 2 of 3

Contractor:		Tine:	Tine: 12:46				
Contract No:		Labora	tory ID:				
Instrument ID:		Initia	l Calibr	ation Date: 09/19/88			
Minimum RF for SPCC is		Maxim	un X Dif	f for CCC is X			
Ecopound	RF	RF	XDiff	CCC SPCC			
Phenanthrene	.91670	1.03025	12.39				
Anthracene	.92993	1.03528	11.33				
Di-n-Butylphthalate	1.56546	1.75524	12.12				
4,4'-Dibromobiphenyl	1.36378	1.44482	5.94				
Fluoranthene	. 99605	1.04022	4.43	•			
Heptachlor Epoxide	•	•	•				
Endosulfan I	•	•	•				
4,4'-DDE	•	•	-				
Dieldrin	-	-	•				
Endrin	-	-	-				
4,41-000	-	•	-				
Endosulfan II	-	•	-				
Endrin Aldehyde	•	-	•				
4,4'-001	-	-	-				
Endosulfan Sulfate	-		•				
Dibutylchlorendate	-	•	-				
Benzidine	.21202	.02003	90.55				
Pyrene		1.40665					
Terphenyl-d14		. 89868					
	1.01773						
	. 22856						
Chrysene		1.13876					
Benzo(a)Anthracena		1.05682					
bis(2-[thy]hexy])Phthalate		1,40900	11.85				
Di-n-octylphthalate		3.09515					
Benzo(a)Pyrene		1,08656					
Benzo(b)Fluoranthene		1,25168					
Indeno(1,2,3-cd)Pyrene		,68930					
Bibenzo(a,h)Anthracene		. 82341					
Benzo(k)Fluoranthene		1.25110					
Benzo(g,h,1)Perylene		,65649					

RF - Response Factor from daily standard file at 25.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

ID:ff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

form VII Page 3 of 3

8B . SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab N	ame:				Contract:_			
Lab C	ode:		Case No.:		SAS No.:		SDG No.:	
EPA S	ample N	o.(Stand	ard):	······································		Date A	nalyzed:	······································
Lab F	ile ID	(Standar	d):			Time A	Analyzed:	
Instr	ument I	D:				×		
	1		IS1(DCB)		IS2 (NPT)			
	-==	======	AREA #		AREA # ======	RT	AREA	
	i	HOUR STD	73181	8.45	256/40	2.00	137464	17.43
	i U	PPER IMIT	146362	 	213580		274/28	·
,	i L	OWER	36591		128070	•	68532	
1	EPA 	SAMPLE NO.	w			===== 		======
ESUST	01 <u>810</u>	8!306BLZ		8.49			234315	
ES649 ES650	03	" MS BU!		8.48		12.00	129665	17.43
	04							
	06							
	08							
	10							
	12							
	14							
	16							
	181							
	20							
	21			<u> </u>	l	 	<u> </u>	1
IS	52 (NPT)	= Naph	Dichlorobe thalene-d8 aphthene-d		i: L	nternal OWER LI	MIT = + 100 standard 6 MIT = - 500 standard 6	area. % of
끆	Cólumn	used to	flag inte	rņal st			s with an a	

FORM VIII SV-1

1903

page __ of __

7

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

	Lab Name:			-	Contract:		siana and the same	•	
	Lab Code:		Case No.:		SAS No.:		SDG No.:		
	EPA Sample	e No.(Stand	lard):			Date Analyzed: 920/			
	Lab File 1	ID (Standar	d):		•	Time I	Analyzed:	/·/	
	Instrument	t ID:	····						
	-		IS4 (PHN) AREA #	RT	IS5(CRY) AREA #	RT	IS4(PRY) AREA #	RT	
	=			======		=====		=====	
;	! !	12 HOUR STD	219253	<i>a2</i> , 02	167327	30 Y/	124851	32.5	
•		UPPER LIMIT	438506		334774		249 702		
i	- 	LOWER	109626	=====	83694	===== 	62426		
į	= I	EPA SAMPLE		20022E		=====	=======		
1		3808/706 KK					30595 ₹		
	ESE 49 021 ESESD 031 041	" msp qul	193/49	22.03	135800	30,40	3560 39899	35.79	
1	05 06	٠ا							
	07 _ 08 _			<u> </u>					
1	09 <u>-</u> 10								
3	11 12								
4	13 ₁₄		-						
]	15 16 17					<u> </u>			
٤	18								
	20j 21j								
1	22 IS4 (Pi	HN) = Phena		i	i	PPER LI	$\frac{1}{\text{MIT} = + 100}$	i	
1	IS5 (CI IS6 (PI	RY) = Chrys RY) = Peryl	sene-d12 lene-d12		L	OWER LI	nal standa: MIT = - 50	}	
?		•	•		0	f inter	nal standa:	rd ared	
,	*C		flag inte	rnal sta	andard are	a value:	s with an a	asteri	
1	page or	f	190	A FORM	VIII SV-2			ļ	

Decafluorotriphenylphosphine (DFTPP)

Case No. AD-76

Contractor ENG SCI(9/7/88)

Contract No. 99-99-99

Instrument ID #1

Date / Time 9/20/88 12:19 Sawa Kurk

Lab ID >D0920::01

Data Release Authorized By: ____

9/16 - Spint

1 1

30.0 - 60.0% of mass 198	'			
	,	47.26 OK		
less than 2.DX of mass 69	!	1.12 OX	(1,626) #1	
mass 69 relative abundance	1	68.77		
less than 2.0% of mass 69	1	0.00 OK	(0.00) #1	
40.0 - 60.0% of mass 198	1	43.92 OK		
less than 1.0% of mass 198	1	0.00 OK -		
base peak, 100% relative abundance	;	100.00 OK		
5.0 - 9.0% of mass 198	1	6.54 OK		
10.0 - 30.0% of mass 198	ŀ	20.95 OK		
greater than 1.00% of mass 198	ł	1,13 OK		
present, but less than mass 443	;	8.50 OK		
greater than 40.0% of mass 198	1	61.39 DK		
17.0 - 23.0% of mass 112	1	11.69 OK	(19.05) 12	
The second secon	mass 69 relative abundance less than 2.0% of mass 69 40.0 - 60.0% of mass 198 less than 1.0% of mass 198 base peak, 100% relative abundance 5.0 - 9.0% of mass 198 10.0 - 30.0% of mass 198 greater than 1.00% of mass 198 present, but less than mass 443 greater than 40.0% of mass 198	mass 69 relative abundance	mass 69 relative abundance : 68.77 less than 2.0% of mass 69 : 0.00 0% 40.0 - 60.0% of mass 198 : 43.92 0% less than 1.0% of mass 198 : 0.00 0% base peak, 100% relative abundance : 100.00 0% 5.0 - 9.0% of mass 198 : 6.54 0% 10.0 - 30.0% of mass 198 : 20.95 0% greater than 1.00% of mass 198 : 1.13 0% present, but less than mass 443 : 8.50 0% greater than 40.0% of mass 198 : 61.39 0%	rass 69 relative abundance : 68.77 less than 2.0% of mass 69 : 0.00 0% (0.00) \$1 40.0 - 60.0% of mass 198 : 43.92 0% less than 1.0% of mass 198 : 0.00 0% base peak, 100% relative abundance : 100.00 0% 5.0 - 9.0% of mass 198 : 6.54 0% 10.0 - 30.0% of mass 198 : 20.95 0% greater than 1.00% of mass 198 : 1.13 0% present, but less than mass 443 : 8.50 0% greater than 40.0% of mass 198 : 61.39 0%

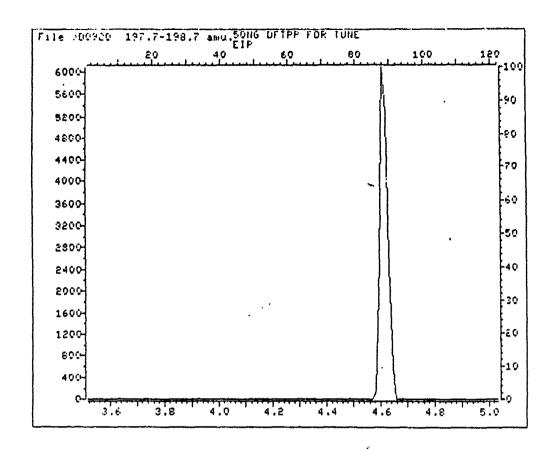
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS. 11 - Value in parenthesis is % mass 69.

12 - Value in parenthesis is X mass 442.

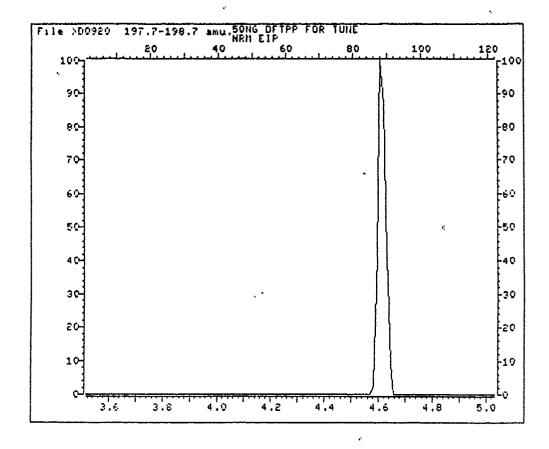
SAMPLE ID	LAB_ID		TIME_OF_RHALYSIS1
14801/706 BLK!	7E5651	1 9/20/88	15:54
1 " BUK MS 1	7E5649	!	14. 04
" BLK MUD!	>E5650	<u> </u>	14.59
122mg/LABRY	> ES648		12:46
			·
·	·	_1	ll
\ <u></u> !_		_!	! <u></u> !
·		_!	اـــــا
·		_	!
ll_		_	l}
			! !
;	<u>, , , , , , , , , , , , , , , , , , , </u>		
			·

FORM U

7/85



tine	Int.	tine	Int.	tine	Int.	tine	Int.	tine	Int.
3.52	0.000	3.83	0.000	4,14	0.000	1,11	0.000	4.75	0.000
3.53	0.000	3.81	0,000	4.15	0.000	4, 46	0.000	4.76	0.000
3,54	0.000	3.85	0.000	4.17	0.000	4.47	0.000	4.77	0.000
3.55	0.000	3. 27	0.000	4.18	0.000	4, 48	0.000	4.78	0.000
3.57	0.000	3.88	0.000	4.19	0.000	4.49	9.000	4.80	0.000
3.58	0.000	3,89	0.000	4.20	0.000	4,51	0.000	4.81	0.000
3,59	C.000	3.90	0.000	4.22	0.000	4.52	0.000	4.82	0.000
3.60	0.000	3.92	0.000	4.23	0.000	4,53	0.000	1.83	0.000
3.62	0.000	3.93	0.000	1.21	0.000	4.54	0.000	4.85	0.000
3.63	0.000	3.94	0.000	4.26	0.000	4.56	0,000	4.86	0.000
3.54	0.000	3.95	0.000	4.27	0.000	4.57	0.000	4.87	0.000
3,65	0.000	3.97	0.000	4.28	0.000	4,58	2.187	4.88	0.000
3.67	0.000	3.98	0.000	4,29	0.000	4.59	41,737	4.90	0.000
3.68	0.000	3.99	0.000	4.31	0.000	4.61	100,000	1.91	0,600
3.69	0.000	4.00	0.000	4.32	0.000	1.62	86.548	4.92	0.000
3.70	0.000	4.02	0.000	4.33	0.000	4.63	41.062	4.93	0.000
3.72	0.000	4.03	0.000	4.31	0.000	4,65	8,995	1.95	0.000
3.73	0.000	4.04	0.000	4.36	0.000	4,66	0.000	1.96	0.000
3.74	0.000	4.05	0.000	4.37	0.000	4.67	0.000	4.97	0.000
3.75	0.000	4.07	0.000	4.38	0.000	4.68	O. COO	1.98	0.000
3.77	0.000	1.08	0.000	4.39	0.000	4.70	0.000	5.00	0.000
3.78	0,000	4.09	0.000	1.11	0.000		0.000	5.01	0.000
3,79	0.000	4.10	0.000	4,42	0.000	1.72	0,000		0.000
3.80	0.000	1.12	0.000	4.43	0.000	4.73	0.000	5.03	0.000
3.02	0.000	4.13	0.000						



1907

See the state of the see of the s

Case No:	Calibration Date: 09/20/88								
Contractor:	line:	12:16							
Contract No:		Labora	tory ID:	3(
Instrument 10:		Initial Calibration Date:							
Mananum RF for SPCC is		Haxir	ion X Di	if f	or CCI	C 15 %			
Compound	RF	RF	XDiff	CCC	SPCC				
H-Hitroso-Dinethylanine	.97318	. 93696	3.72						
2-Fluorophenol	1.19718	1.22023	1.92						
bis(Z-Ch]oroethy])ether	1.72380	1.73545	.68						
Phenol	1.60763	1.63142							
Phenol-d5		1.44923							
Aniline	1.25111	1.04746	16.20						
	1.33134	1.33499	. 27						
1,3-Dichlorobenzene	1.39328	1.47278	5.71						
1,4-Dichlorobenzene	1.25213	1.39776	11.63	Ħ					
Benzyl Chloride	-	-	•			٠			
•	.15892								
•	1.30329								
• •	1.07027								
	1.11935					(Conc=50.00)			
bis(2-chloroisopropyl)Ether									
H-Hitroso-Di-n-Propylamine					**				
Hexachloroethane	.58509	,58815	.52						
Dibromochloropropane	-	•	•						
Na trobenzene		.47067							
Hitrobenzene-d5		. 39152							
2-Hs trophenol		.21501							
Isophorone		.81593							
bis(Z-Chloroethoxy)nethane		.50802	2.37						
2,4-Dinethylphenol		. 29399	11.23						
Benzoic Acid		.24180							
2,4-Dichlorophenol		.30426							
1,2,4-Irichlorobenzene	.32164								
Maphthalene		. 92740							
1-Chloroaniline		.36496							
Hexachlorobutadiene		.19822							
1-Chloro-3-Hethylphenol		.32830							
2-Methylnaphthalene	. 19672	.53371	7.45						

PF - Pespense Factor from daily standard file at 25.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:		Calibr	ation D	ite:	09/20/	'88 · · · · · · · · · · · · · · · · · · ·
Contractor:		line:				
Contract No:		Labora	tory 10		648	
Instrument 10:		Initia	l Calib	atio		: 09/19/25
Minimum RF for SPCC is		Maxim	ous X Di	ff f	or CCC	15 I
Compound	RF	Rf	XDiff		SPCC	
Hexachlorocyclopentadiene	.34256		3.37		**	
2,4,6-Irichlorophenol		. 38174				
2,4,5-Irichlorophenol		.38174				
2-Fluorobiphenyl		1.05582				
2-Chloronaphthalene	1.06734					
2-Mitroaniline		. 56556				
Dinethylphthalate		1.29520				
2,6-Dinitrotoluene	.37240	. 38237				
Acenaphthylene	1.43234	1.64883	15.11			
3-Mitroaniline	.61164	.54950	10.16			
2,4-Dinitrophenol	.21222	.15711	25.97			•
Acenaphthene	1.00882	1.12041	11.06	¥		
Dibenzofuran	1.48405	1.49012	.41			
2,4-Dinitrataluene	.35416	. 34529	1.38			
4-Kitrophenol	.56574	.23117	59.14		**	
Fluorene	1.16382	1.24422	6.91			
Diethylphthalate	1.29579	1.50905	16.46			
1-Chlorophenyl-phenylether	.47028	.51233	15.32			
4-Hitroaniline	.35809	, 30634	14,45			
2,4,6-Tribromophenol	.18471	.17937	. 2.89			
1,2-Diphenylhydrazine	-	•	-			
Alpha-BHC	•	•	•			
Bela-BHC	-	•	-			
Ganna-B4C *	•	•	-			
Delta-BHC	-	•	-			
Heptachlor	•	•	-			
Aldrin	•	-	-			
H-Hitrosodiphenylamine	.39351	. 17291	20.18	¥		
1,6-0:n:tro-2-Hethylphenol	.12828	.15328	19.49			
4-Bromophenyl-phenylether	.20837		8.13			
Hexach] or obenzene		. 29568				
Pentachlorophenol	.19068	.15933	16.44			

RF - Response Factor from daily standard file at 25.00 ng/L

PF - Average Response Factor from Initial Calibration Form VI

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VII Page 2 of 3

Carlandor	*****	14	17.45	******				
Contractor:		line:	12:16 	••••••				
Contract No:		Laboratory IO: >E5618						
Instrument ID:		Initia	l Calib	ration Date:	09/19/88			
Minimum RF for SPCC is		Maxam	un X Di:	ff for CCC is	; X			
Compound	RF			CCC SPCC				
	.91670							
Rnthracene	.92993	1.03528	11.33					
Dı-n-Butylphthalate	1.56546	1.75524	12.12					
1,1°-Dibromobiphenyl	1.36378							
Fluoranthene	.99605	1.04022	4.43	•				
Heptachlor [poxide	•	•	-					
Endosylfan I	-	•	•					
1,4'- DDE	•	•	-					
Dieldrin	-	-	-					
Endrin	•	•	-		<			
4,4'-000	-	•	•					
Endosulfan II	-	•	-					
Endrin Aldehyde	-	-	-					
1,4'-001	•	•	-					
Endosulfan Sulfate	-	•	•					
Dibutylchlorendate	-	•	-					
Benzidine	.21202	.02003	90.55					
Pyrene	1,43648	1.40665	2.08					
Terphenyl-d14	1.01113	.89868	11.12					
Butylbenzylphthalate	1.01773	1.06793	4,93					
3,3'-Dichlorobenzidine	.22856	.14941	34.63					
Chrysene	1,17468	1.13876	3.06					
Benzo(a)Anthracene	1.25941	1.05692	16.09					
bis(2-Ethylhexyl)Phthalate	1.25969	1.40900	11.85					
Di-n-octylphthalate	2.46859	3.09515	25.38	*				
Benzo(a)Pyrene	1.06996	1.08656	1.55					
Benzo(b)Fluoranthene	1,16574	1.25168	14.60					
Indeno(1,2,3-cd)Pyrene	.70560	.68930	2,31					
Dibenzo(a,h)Anthracene	.64885	. 82341	26.90					
Benzo(k)Fluoranthene	1.00583	1.25110	24.39					
Benzo(g,h,ı)Perylene	. 19832	.65649	31.74					

RF - Response Factor from daily standard file at 25.00 mg/L

Form VII * Page 3 of 3

RF - Average Response Factor from Initial Calibration form VI

ID:ff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPEC - System Performance Check Compounds (**)

8B SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab N	ane:			Contract:_		•	
Lab C	ode:	Case No.:		SAS No.:	*************************************	SDG No.:	
EPA S	ample No.(Stan	dard):			Date /	analyzed:	· · · · · · · · · · · · · · · · · · ·
Lab F	ile ID (Standa	rd):			Time /	Analyzed:	· · · · · · · · · · · · · · · · · · ·
Instr	rument ID:				v		
	1	IS1(DCB)		IS2 (NPT)		IS3(ANT)	
		AREA #	RT	AREA #	RT	AREA #	:
	12 HOUT	<u> 43181</u>	8.45	256/40	2.00	137464	17.43
	UPPER LIMIT	146362		213080		274/28	
1	LOWER	36591		128070		68532	
1	EPA SAMPLE NO.						
ES657 ES649	02 81081706BCZ	118375	8.49	464213	12.01	224315	17.44
ESUST	031 "INSDA		8. 48		12.00	120343	17.42
-	04						
	06					 	
	08						
	10						
	12						
	13				 		ll
	15						
	17						
	18 19						
	20	 			 	<u> </u>	
· ·	22 S1 (DCB) = 1,4-	Dichlorober	nzene-d	111	PPFR IT	MIT = + 10	1
· I:	S2 (NPT) = Naph	thalene-d8		i	nternal	standard	area.
13	S3 (ANT) = Acer	aphthene-d	8			MIT = - 50 standard	
a	Cólumn used to	flag inte	rnal sta	andard are	a°value	s with an	asterisk

1911

page __ of __

FORM VIII SV-1

10

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARI

1	Lab Name	·			Contract:			
1	Lab Code	:	Case No.:		SAS No.:	-	SDG No.	
1	EPA Samp	le No.(Stand	dard):			Date A	Analyzed:	9/20/78
1	Lab File	ID (Standa:	rd):	······································	•	Time A	Analyzed:_	/· <i>i</i>
. 1	Instrume	nt ID:				<i>'</i>		
			IS4(PHN) AREA #		IS5(CRY) AREA #	•	IS4 (PRY) AREA #	•
:		12 HOUR STD				30 Y/	124851	32.54
			438506	=====	334774	*=====		1
•		LOWER LIMIT EPA SAMPLE	109626		83694	=====	<u>62426</u>	32 ==2=
	ESE 49 02 ESES 03 04 05 06 07 08 09 10		404192	22.04 22.03	19854	30,41	30595 Q 85660 49899	
Married branch br	13 14 15 16 17 18 19							
]	IS5 (sene-d12	10	0:	f inter	MIT = + 100 nal standa: MIT = - 50	rd area.
;		umn used to	flag ințe				nal standar s with an a	

\$...

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: Engineering Science

Job No.:

Project:

Client:

1 X 7 .

The second secon

File ID: >01927

Attn:

DFTPP Injection Date: 9/27/88 12:

Address:

DFTPP Injection Time: 9/27/88 12:23

Date Reported: Instrument ID: 2

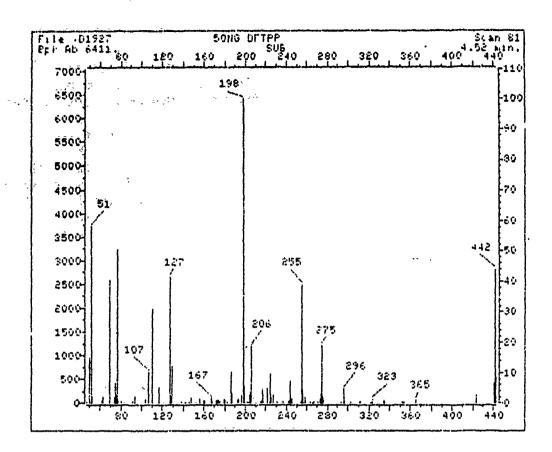
		I ON ABUNDANCE CRITERIA	% REL	
** ** ** ** ** ** ** ** **	51 65 69 70 127 197 198 199 275 365 441 442	30.0 - 60.0% of mass 198	50.1 40.5 40.6 41.6 10.6 10.6 10.6 10.7 10.7 10.7 10.7 10.7	0.0/1; 0.0/1; 0.0/1;
1.				!

1-Value is % mass 69

2-Value 15 % mess 442

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDAPOS:

•				
1	· LAB .	LAB	DATE	TIME
	SAMPLE ID	FILE ID	ANALYZED	ANALYZES
1021		医以发作三共元素自己的以少者	******	电子机图数数据数数
0122	40mg/L ABN std	E5721	9/27/88	12:49
027.7	25 my/L ADN stol	E 5722		13.48
0322	60 mg/L AGN std	E5719.		09:56
0422	80 my/LABN Std	e5724		15:37
05ZZ	120 my/L ABN std	ES725		16.35
9622	10 mil ABN std	F5726	•	17.26
977.2	0			
0822	j.			
09ZZ_				
1022			,	-
1122		-		
1222	•			
1322	*			
1422				
1522	,-			
1522	•			
1722				
1822	-			
1977	1913			
2023	TOIL			
2177			1	•



file:	201927	Scan 1:	81	Rein.	tine:	4.52
	151161	20011 8.	v:	716 6111	23115	11.44

	Int.		Int.		Int.		Int.		Int.
					1.045				.187
50.00	14.898	141.95	.57?	195.00	2,558	243.00	.749	285.15	. 250
51.10	58.119	145,35	.437	198.00	100,000	244.00	7.175	293.05	.374
52.00	1,950	149.65	1.632	193.00	5.600	245.00	1.310	295.15	.234
61.95	.842	156.05	1.497	200.00	.047	246.00	1.607	295.95	4.726
63.05	2.028	158.05	. 296	201.50	.577	247.05	.070	297.05	.562
55.95	40.462	160.05	.873	203.05	. 250	254.10	.296	302.95	.499
74.05	2.137	161.05	. 827	203.55	2.683	255.00	38.739	311.15	.296
75.05	6.489	167.00	1.731	201.95	3,478	256.00	4.477	312.15	.468
76.05	2.948	168.05	. 9 05	205.95	18.624	257.00	.187	314.10	.234
77.05	50,398	172.00	.827	207,95	.062	258.00	2.059	320.90	.234
79.05	1,529	173.00	.593	210.05	.031	253.10	. 593	322.00	.218
80.05	.702	174.00	1.045	215.05	.577	263.20	. 406	323.00	1.248
92.05	.796	175.06	.374	216.05	.437	265.10	.172	324,10	.203
93.00	1.950	176.00	.686	216.95	4.617	265.90	.031	354.10	.811
01.00	1.661	177.00	. 250	218.05	, 655	267.10	.265	335.00	. 296
07.00	10:139	179.00	1.154	220.95	4.649	271.10	.343	351.95	.390
00.30	.094	180.00	1.061	223.05	.109	272.40	.312	352.95	.218
10.00	30.775	182.10	.6?1	224.65	9.624	273.00	1.357	353.95	.46B
17,60	5.147	184.10	. 250	224.95	2.106	274.00	3,213	364.85	1.123
27.00	41,413	186.00	10,061	226.95	2.657	275.00	19.123	123.00	2. £û8
28.09	1.997	187.00	3.354	229.05	.18?	276.09	2,433	111.05	6.598
29.00	11.508	190.10	.047	231.05	.312	276, 95	. 983	141.95	43.691
34.65	.034	192.60	1,170	236.05	.343	278.69	.031	443.OS	8.454

**********************		*****		******				*****		*****	
H-Hitroso-Dinëthylanine	1.08569	1.30052	1:11426	1.02763	1.37662	1.22750	•	. 421	1.20337	12.712	
2-Flucrophenol	.66997	1.52534	1.20999	1.15261	1.30093	1.25050	•	.677	1.19956	23.916	
has(2-Chloroethyl)ether	1.27818	1.58087	1.30986	1.23229	1.72206	1.58876	•	.944	1.45200	14.011	
Flienal	.85186	1.79310	1.63109	1.38016	1.61972	1.49519	•	.940	1.46685	22.680	
Phenol-dS	. 78237	1.50354	1.46145	1.28144	1.38407	1.24329	•	. 936	1.27603	20.514	
Aniline	1.36722	1.41046	1:10544	.79925	1.55410	1.59067	•	. 923	1.30453	23,106	
2-Chlor ophenol	1.22315	1.52390	1.33856	1.28053	1.39813	1.29974	•	. 956	1.34400	7.868	
1,3ºDichlorobenzene	1.51830	1.60947	1.39505	1.35971	1.39062	1.27648	•	. 988	1,42494	8.371	
1,4-Dichlorobenzene	1,44534	1.39100	1.32457	1.1750?	1.24020	1.12528	•	1.006	1.28358	9.73?	
Benzyl Chloride	•	•	•	•	•	•	•	•	•	•	
Benzyl Alcohol	.08913	.16395	.11103	. 29092	.20105	.19096	•	1.120	.17434	41.464	
1,2-Dichlorobenzene	1.43612	1.51121	1.34259	1.25425	1.20235	1.21271	•	1.060	1.3398?	8.538	
2-Methylphenol	. 92919	1.87322	1.14661	1.39167	1.42565	1.23273	•	1.122	1.33318	23,996	
3-5-1-Methylphenol	1.01742	1.34632	1,07693	1.05391	1.10139	. 99307	•	1.177	1.09850	11.621	(Canc=20.0,50.0,80
bis(2-chloroisopropyl)Ether	2.24728	2.79953	2.18141	2.16660	2.75649	2.55200	•		2.45055		
N-Histrosa-Di-n-Propylanine	1.12508	1.29120	1.14914	.91229	1.37319	1.25128	•	1.1?0	1.10870	12.747	
Hézachi oroethane	.66696	.70723	.62609	.57201	.61689	.56167	•	1.156	.62514	8.880	
Orbronochlorópropane	•	-	÷	•	•	•	•	-	•	•	
Histrohenzene	.51595	. 55896	.48810	.57186	. 48727	.79458	-	.840	.56945	20.333	
Hitrobenzene-dS	.37411	. 46072	.41073	.42850	.41716	. 36574	-	. 835	. 40943	8.607	
2-Mitrophenoi	.18582	. 24426	.22939	.24184	. 24345	. 22354	•	.914	. 22805	9.797	. 1
Isophorone	.79?23	.97906	. 85826	.91435	.93001	.84316	•	.902	. 89701	7,458	-intial
bisil-it.loroethoxyimethane	.49171	. 58553	.51441	.55222	.59588	.52884	-,	.961	.54476	7.488	- mul
2,4-Dimethylphenol		. 33298			.28310				.29644		•
Benzoic Acid	-	.17773	.14566	.25101	. 29732	.3236?	•	1.019	.23912	31.811	11 9
2,4-Dichlorophenol	.18128	. 30682	. 28275	. 29435	.27638	.23766	-	. 981	.26321	17.651	الما
1,2,4-Irichloratenzene		. 32791			. 29758				. 30633		
Naphthalene		. 90741			.85583				.87644		
4-Chloroaniline		. 12802			. 30030				. 34235		UT I A ' \
Herachlorobutadiese		.18608			,15773				.17620		1
	. 23901				. 36985		•		. 32730		
2-Metnylnaphthalens			.52910						.51061		
Hexachlorozyciopentadzene			.35655						. 32738		
2,4,6-Irichlerophenol			.40297						.33927		
2,4,5-Irichle: ophenol	-		.40297						. 35674		
2-fluorobiphenyl			1.03208						1.02602		
2-Chiloronaphthaiene			1.09991						1.09146		
*	.52645								.60933		
Direthylphthalate			1.16212						1.09915		
and with the support	1150100					101170		1716	,,,,	141111	

of shalls - 10/2

RF - Response factor (Subscript is amount in ng/L)

RFI - Ruerage Relative Retention line (RI Std/RI Istd)

PT - Average Résponsé l'actor

The second secon

IPSD - Percent Relative Standard Deviation

Page 1 of 3.

Calibration Peport

Title: 10 625 ACIO AND BASE/HEUTRALS + ELPHENOL_ONSBP&2-NO2-4-MEPH Calibrated: 880928 09:57

F11: Conpound	es: >E5726 RF 10.00	>E5722 RF 25.00)E5721 RF 40,00)E5719 Rf 60.00	>E572 1 RF 80.00)E5725 RF 120.00	RF 160.00	RRI	RF	X RSD
2,6-Dinitrotoluene	. 29499	.35265	. 35675	. 32539	. 29598	.28087	•	.982	.31777	10.099
Acenaphthylene	1.73106	1.71268	1.53484	1.43551	1.43958	1.39242	•	.971	1.54101	9.567
3-Hitroaniline	.56554	.67944	.57668	.51562	. 63383	.60430	•	1.005	.59590	9.560
2,4-Dinitrophenol	•	.04276	.05309	.15468	.15543	.17204	•	1.026	.11560	53.868
Acenaphthens .	1.12789	1.08331	1.00565	.90161	. 93906	. 66255	•	1.006	.98669	10.586
Dibenzofuran	1.41013	1.53117	1.33485	1.30011	1.34789	1.29948	•	1.035	1.37061	6.458
2,4-Dinitrotoluene	.27726	.39180	. 32554	.32134	. 37324	. 29367	•	1.052	.3304?	13,453
4-Ni tropheno!	•	.10012	. 22252	. 21520	.27420	.28494	•	1.057	. 2354û	18.504
Fluor ene	1.15826	1.21906	1.07000	1.04536	1.01533	.95797		1.09?	1.07776	8.860
Diethylphthalate	1.44578	1.38220	1.25424	1.07538	1.10661	1.07526	•	1.102	1.22324	13.339
4-Enlorophenyl-phenylether	.51993	. 19562	.46176	. 39977	. 36829	.35814	-	1.103	. 43391	15.696
4-Mitroaniline	•	. 36054	.31116	.28563	.33747	.28214	-	1.122	. 31539	10.677
2,4,6-Tribronophenol	-	.14340					•	1.148	.15076	16.588
1,2-Diphenylhydrazine	-	-		•	•	•	•	-	•	•
Alpha-BHi	•	-	•	-	•	-	•	•	-	
Bela-BMC	•	-	•	-	•				•	
bama-BHC	•	-	•	-	-	•		•		•
Del ta-EHC	-	•	•	•		•		•		-
Heptachlor	•		•	•	-	•			•	-
Aldrin	•	•	•	-	•		•	•	•	-
N-N: trosodiphenylamine	.51172	. 49604	. 49128	. 35285	. 30906	.40275	•	.893	. 42741	19.907
4.6-Dinatro-2-Hethylphenol	•	.10640	.08164	.11332	.12217	.11236	•	. 892	.10717	14.315
1-Bronophenvl-phenylether	. 22049	. 22452	.21520	.20318	.19357	.19133	-	.910	. 20902	6.614
Hexachlerobenzene	.26964	. 27834	. 28381	. 28195	.24251	.24865	-	. 958	. 26747	8.635
Fentachloropheno!	-	.07263	.06770	.09375	.08809	.09579	-	.999	.07959	17.599
Phenanthrene	1.03639	1.00904	.98111	.91722	.99633	. 97687	-	1.004	. 99099	3.058
Anthracens	1.01560	. 56954	.95072	.92002	. 81856	.97687	•	1.009	.94190	7.231
Ox-n-Butylphthalate	1.64558	1.70985	1.51810	1.55083	1.58595	1.51052	•	1.105	1.58680	1.91 É
4,4'-Oibromobiphenyl	1.35480	1.20790	1.23853	1.16983	1.02085	. 93552	•	1,141	1.15457	13,197
Fluoranthere	.77412	.84940	. 80139	. 82733	.8496£	.79£39	•	1.176	. 81689	3.732
Heptachlor Eporide	•	•	•	•	•	-	-	•	•	•
Endesulfan I	•	-	-	•	•	•	•	-	•	-
4,4'-00[-	•	•	-	•	•	•	•	-	-
Dieldrin	•	•	-	-	•	-	• ,	•	-	•
Endran	•	-	-	•	-	•	:	•	•	•
4,41-000	-	-	•	•	•	•		-	•	•
Endosulfan II	•	•	-	•	•	-	-	-	-	-
Endrin Aldehyde	-	-	•	-	-	•	-	-	•	-
4,4'-601	•	٠.		-	•	-		•	-	-

Rf - Response Factor (Subscript is amount in mg/L)

RFI - Ruerag. Relative Retention line. (PI Std/RI Istd)

Ff - Average Response factor

XRSD - Percent Relative Standard Deviation

16601	BOOYER GALAL		

Eompound	ıles: >	E5726 RF 10.00)E5722 Rf 25.00)E5721 RF 40.00	XES719 RF 60.00	XE5724 RF 80.00	>ES725 Rf 120.00	RF 160.00	RRT	- RF	Y RSD
Endosulfan Sulfate		-	•	•	•		-		•	-	-
Orbutylchlorendate		•	•	•	-	-	•	•	•	•	-
Benzidine		-	.04609	.02280	.12215	.18403	.33976	•	.869	.1429?	86.939
Pyrene	1	.57519	1.86759	1.65577	1.58611	1.67623	1.76581	•	.872	1.68778	6.629
Terphenyl-dl4		.95373	1.18674	1.12395	1.08741	1.05957	1.14049	•	. 894	1.09198	7.388
Butylbenzylphthalate	1	.15372	1.31230	1.25941	1.17083	1.30714	1.37430	•	.953	1.26295	6.831
3,3'-Dichlorobenzidine		.01837	.16210	.16488	.17788	. 24508	.24737	-	1.001	,16928	19.257
Chrysene	1	.10796	1,12550	1.11456	1.09010	1.13408	1.12459	•		1.11613	1.404
Benzo(a)Anthracene		.97810	1.16979	1.10416	1.07133	1.30827	1.30441	•	, 998	1.15601	11.404
bis(2-Ethylhexyl)Phthalat	e 1	.57439	1.62858	1.51249	1.46744	1,51408	1.56359	•	1.018	1.54343	3.689
Dr-n-octylprithalate	3	.20019	3.43083	3.53434	3.06346	3,04689	3.10461	•	.934	3.23005	6.35?
Benzo(a)Pyrene		. 85431	1.09481	1.06907	1.11781	1.13635	1.12146	•	.994	1.06563	9.963
Benzo(b)fluoranthene	i	. 32056	1.55167	1,46206	1.32273	1.79129	1.74230	•	.961	1.53177	13.227
Indeno(1,2,3-cd)Pyrene		.79661	.93693	1.00946	1.17862	1.24651	1.26528	•	1.150	1.07257	17.524
Oibenzo(a,h)Anthracene		.91469	1.03756	1.16094	1.10202	1.03475	1.14262	•	1.156	1.06543	8.465
Benzo(k)[luoranthene		. 98055	1.02262	1.46206	1.10326	.69815	.87871	•	. 963	1.02429	24.979
Benzo(g,h,1)Perylene		. 75223	. 96936	.99427	.92269	1.05895	1.07197	٠	1.194	.96158	12.140

RF - Response factor (Subscript is amount in ng/L) >

FPT - Average Relative Retention Time (RT Std/RT Istd)

PF - Average Pesponse Cactor

IPSD - Percent Relative Standard Deviation

ATTLE OFGANICS INITIAL CALIBRATION DATA

Name:ENGINEERING SCIEN	Contract:						
Code:Case No.:_		_ SAS	No.:		_ SDG N	lo.:	
strument ID.:CARBOPAK_ Ca	librat	tion Da	ate(s):	: <u> </u> 8/18/	/88	8/15	5/88_
AB FILE ID:	RRF1)=84	, 40	RRF20)= <u></u> 85,	41	
(RF 50=_82, 42	RRF1)0= <u> </u>	5, 43_	RRF20	00=87,	44	
MPOUND	RRF10	RRF20	RRF50	RRF100	RRF200	RRF	%RSD
enzyl chlomos	0.08	0.04	0.09	0.10	0.08	0.08	29.24
.s (O-chorpethoxy)			٠.,				
methane	0.03	0.03	0.05	0.04	0.06	0.04	31.04
s (2-onerousopropy)							
End to be the text	0.24	0.27	0.26	0.24	0.30	0.26	9.50
omobenzene	1.00	1.26	1.31	1.23	1.26	1.21	10.06
omoduchloromethane		2.97	3.04	3.40	3.40	3.20	6.17
-omoform	0.98	0.92	0.87	1.49	1.30	1.11	24.18
omozet hanr	0.13	0.24	0.20	0.27	0.26		25.25
arbon tetrachionide	2.90	2.87	2.78	3.13	2.92	2.92	
doroacetaldehyds	0.001	0.002	0.001	C.0015		امراع	4.36
nlorobenzone	1.33	1.34	1.24	i.37	1.35		3.90
olonoethame	0.47	0.47	0.50	0.46	0.48		3.51
alonofo: #	3.29	4.36	3.80	4.17	3.78		10.65
-Charate and	0.83	0.89	0.95	0.91	1.00		7.83
-Chlore-thyl vinvl ether	0.03	0.03	0.05	0.04	0.08		31.04
donome thane	0.71	0.25	0.32	0.34	0.00		21.72
plorometh, a methyl ether_	0.12	0.21	0.22	0.16	0.15		24.46
,m,: p_Cb)orotoluenes _	4.21	4.22	3.93	3.70	3.90		
brows: nluromethane	3.30	3.10	3.12	3.79	3.53		8.71
bromomethau-	2.98	3.04	3.29	3.04	3.5a		8.87
.2_Dtchlorobenzene	2.61	2.38	2.22	2.34	2.19		7.18
3_Dichlorobenzene	2.02	1.95		1.99			
.4_Dichlorobenzene	2.47	2.62	2.13	2.37	2.18	2.35	
chlorodifluormethane	0.51	0.49	0.50	0.57	0.64		11.63
.1_Dichloroethane	0.76	0.83	1.27	1.65	1.54		33.23
.2_Dich!oroethane	1.87	1.87	2.02	2.27			9.44
.1_Dichioroethylene	7.41	2.26	2.17	2.28			
ans_1,2_dichloroethylene	0.91	1.06	1.35	1.57			10.75
.chloromethane	17 61	4.97	3.63				21.15
.2_Dichloropropane	2.45	2.50	1.69	3.57	2.24		78.18
.3_Dichloropropylene	4 40	4.56	4.69	1.84	1.83		18.50
.1,2.2_Tetrach] or oethene_	7 49	6.99		4.50	4.66	4.60	
\$1,1,0_Tate outlong thane	ייייי			6.87	5.87	6.71	
stract on perhology	7.00	3.60 6.99	3.41	3.20	3.94	3.61	
.1,1_7richlo.pethane	1 000			6.87	5.87	6.71	
.3,5 Truck or sembane	4.40	4.56	1.89 4.69	2.11	2.15	2.02	
ichiar art. Car.	4 77	4.27	3.77	4.50	4.66	4.60	
actilizated associations	5 - 1 - 2 5 - 60%			3.83	3.65		11.0
The second secon	A ATT		1.91	2.04	1.60		11.59
A Children Carlotte Committee Commit	** * ** *	3.74	3.60	3.29	2.83		16.77
the second secon	W. 257	0.90	0.96		1.06	0.95	7. 6.3
			191	8			

ATILE ORGANICS INIT	IAL CALI	BRATION	DATA				
DName: ENGINEERING SC	IENCE		Contr	act:			
Code:Case	No.:	SAS	No.:_	SI	OG No.:		
trument ID.:CARBOPA	K Calibr	ation Da	ate(s):8	3/18/88_			
AB FILE ID: RRF 10	84		RRF 20	_85			
AB FILE ID: RRF 10 RF 50=82	RRF100:	=66		RRF200:	=_87		
I. DMPOUND	RRF10	RRFIO	RRF50	RRF100	RRF200	RRF	%RSD
nzene	4.46	2.84	2.55	2.94	2.92	3.14	23.95
nlorobenzene	9.53	6.39	4.58	4.56	4.02	5.82	38.8°
2_Dichlorobenzene	2.84	2.74	2.80	2.94	2.96	2.85	3.31
3 Dichlorobenzene						3.08	
,4_Dicnloropensene	3.04	3.55	3.04	3.32	3.23	3.24	6.57
hyl Benzene	4.26	3.14	2.47	2.74	2.66	3.05	23.40
luene		4.56	3.16	3.08	2.37	4.05	46.33
less						FRR	ERI

ATILE ORGANICS INITIAL CALIBRATION DATA

Name:	~	·	act:	t:				
Code: Case No.:_		_ SAS	No.:_		SDG N	٧٥٠:		
trument ID.:CARBOPAN_ Ca	librat	tion Da	ate(s):	8/19/88	8	8/15/88	3	
AB FILE ID:	RRF10	0=_7,40)	RRF20	= 8,41			
RF 50=1,42	RRF10	00≕_9,4	13	_ RRF20 RRF20	0 = 10,	14		
מיזטפאא	RRF10	RRF20	RRF50	RRF100	RRF200	RRF	%RSD	
nzyl chloride	0.08	0.04	0.09	0.10	0.08	0.08	29.24	
s (2-choroethoxy)								
methane	0.03	0.03	0.05	0.04	0.08	0.04	31.04	
s (2-choroisopropy)								
ether	0.24	0.27	0.26				9.50	
omoben:eno	$_{.}$ 1.00	1.76	1.31	1.23			10.00	
omodich) or omethane	. 3.57	₹.80	3.78	3.53			3.36	
omoform	. 1.87	1.41	1.01	1.43			21.66	
omomethene	0.17		0.23				28.18	
rbon tetraction de	2.9	3.34	3.26		3.24	0.00	21 4:30	60
loroacetaldehyde	0.001	0 002	0 001	6.0005			21 Ef -	φ
Loroben; etc.	1.41	1.54	1.20	1.34			9.5%	
locostname	0.46	0.55	0.56		0.63			
lorofona '	. 5. <u>0e</u>	5.08	4.11		4.06			
Chorche, sne	. C.SI	0.88	0.95		1.02			
Chlorosia, to a myl ether_			0.05		೮.೦6			
loromethage	0.28	0.33			0.43			
loromethy) nethy, ether_			0.02		0.15		24.46	
,m_,& p_Chiorotoluenes _			3.93				5.56	
bromochloromethans	3.73	4.21			4.37			
bromometh <i>a</i> ne	98	3.04					8.87	
2_Dichlorobenzene		21.71	2.83				12.20	
3_Dichlorobenzene	$\frac{2.01}{2.5}$		1.76				7.22	
4_Dichlorobenzene		2.84	2.09	2.33			14.67	
chlorodifluormethane		0.49			0.64		11.63	
1_Dichloroethane	1.13	1.96	2.10	1.93	2.02		7.03	
2_Dichloroethane		5.07	2.49		2.35		6.03	
1_Dichloroethylene	2.50	2.66	2.42	2.30	2.25		7.10	
ans_1,2_dichloroethylene			1.64	1.64	1.65		15.70	
chloromethade	_ B. 41	5.09	3.65	3.11	2.95		33.87	
D_Dichloropropane	. 2.37 	2.97		2.93	3.18		19.31	
3_Dachi wow opylene		4.56	4.69	4.50	4.66 4.15			
1,2.7.7c% reniernethanc			5.96 3.41	5.90 3.20	6.15 3.94		13.57 8.71	
1.1. i.e. chiergethans_		7.70			6.13		13.5	
tracination of the machine	. (****) 		5.96		2.14		30.00 3.57	
1. Jensey and the second		2.30	2.26					
1,2_Truchlorostham	4.6%		4.69		4.66		1.65	
achier with the	5.00		4.35		3.71		14.73	
achilo, and two carticines.					7.00			
AND THE PARTY OF T	4, 13	7.74	3.40	3.29	.83		1.9	

Sample of the sa							
LATILE ORGANICS INITI	AL CALI	BRATION	DATA				
bName:ENGINEERING SCI	ENCE		Contr	act:			
-b Code: Case N	lo.:	SAS	No.:	sı	OG No.:		
strument ID.:CARBOFA							
LAB FILE ID: RRF 10	7		RRF 20	8			
1_RFF 50=1	RRF100=	=9		RRF200=	=10		
OMPOUND	REF10	RRF20	RRF50	RRF160	RRF200	RRF	%RSD
enzene	4.83	3.02	2.71	2.50	2.45	3.10	31.90
🖁 nlorobenzene	8.28	5.69	4.79	4.07	3.71	5.31	34.30
* 7 Dichloropaptena	1.90	-2.33	2.79	2.41	2.75	2.44	14.91
,3_Dichlorobenzene	2.24	2.67	3.08	0.57	2.90	2.71	11.57
,4_D;chloroben:enn	2.07	2.41	2.83	2.60	2.74	0.00	11,5%
ithtl Bennen-	<i>†</i> . ∵ ∵ .	4.00	2.64	2.43	2.24	3.5t	45,93
പിലാത്ത	8,08	5.26	3.25	2.74	2.48	4.40	55.08
i ylenwe	9.14	8.10	7.14	6.76	7.02	7.63	12.90

TILE CONTINUING CALIBRATION CHECK

lame:				Contract:	
Code:_	Case No.:		SAS	No.:	
.rument	ID:CARBOPAK	Calit	bratio	on Date(s):8/19/8 &	c
B FILE	ID:01	Init.	Calit	Date(s):8/15/88	,5/15/8 C

1POUND	RRF	RRF50	%D
myl chloride	0.08	0.06	23.12
: (2-choroethory)			
	0.04		100.00
thanei (2-chormisophopy)			
1er	6.26		100.00
mobenzen	1.21	1.05	13.03
imod; chloromethane	3.20	3.78	-18.28
omoform_	1.11	1.01	8.60
momethans	0.22	0.23	-3.22
bon tetrach) heres	2.93	3.26	-11.61
on operation (e) and		-	ERR
onobeniene	1.32	1.20	8.85
and the state of t	0.48	0.56	-16.20
.oroethane	3.88	4.11	-5.87
. or ot or r	0.92	0.70	23.86
horohezane	O.92	0.10	100.00
Chierceth d vinyl ether_	0.17	, TT T1	-18.05
onomethal almal stoat _		0.32	100.00
Coupustly - The Espect -	0.17	TW .T. 4	
milt bil ford-oldenes i	3.50	3.C1	24.64
Manager of americans	7.57	3.31	1.98
, ememethans	<u> </u>	2.97	0.48
I_D:chlorobenze.e	2.25	2.83	-20.31
Laichle oberzene	1.54	1.70	9.23
_Dichloropenzen-	2.35	2.09	10.99
nlorodifluormethane	0.54		100.00
Dichloroethane	1.21	2.10	-73.85
	2.03	2.49	-22.86
Dichloroethylane	2.12	2.42	-14.26
ans_1,2_d;chloroethylene	1.25	1.67	-33.23
.h)oromethane	5.46	3.65	33.09
.h)oromethane ?_Dich]oropropane	2.05	1.85	10.07
*_Dichloropropylene	4.60	3.99	13.04
.2,2_Tetrachloroethane_	6.71	5.96	11.23
2,1,2_Tetrachioroethane_	3.61	2.74	24.09
rachloroeth\lene	6.71	5.96	11.18
1_Trichloroernanc	2.02	2.26	-12.03
. Thurn, or ceinage	4.60	3.99	13.26
The Control of 1922 Birth	4.05	4.15	-2.41
Chier in . www.mei bene	1.67	21.14	-8.50
.cnloren osane	J.59	2.70	24.71
. Chlerie	0.95	1.06	-11.97
The second section of the section of the sect	10 8 7 67	A # 12 53	/ 1

ATILE CONTINUING CALIBRA	ATION CH	ECK		
Name: ENGINEERING SCIENCE		Contra	act:	
Code: Case No.:_	SAS	No.:	SDG No	
frument ID.:CARBOPAK Cal:	ibration D	ate(s):8	/ 16 / 99	
F FILE IE: ARR 50CO			Inibl	calib = 8/15/88
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			· · · · · · · · · · · · · · · · · · ·	<u></u>
gntification	FRE	RRF50	%D	
ent ene	4.25	7.71	-34.27	
nlorobenzane	4.97	4.79	-3.59	
2_Dictd or obwhrere	3.48	2.79		
1.3 Dichlorus-wese	3.91	3.08	-21.14	
.4 Distordumpers	3.45	2.83	-22.37	
hyl Benrons		2.64		
i dene		3.25		
Date		8.18		

This page intentionally left blank,

DATA PACKAGE #31

This page intentionally left blank.

Job No.:

OR001.02

Client: Attention: ES Oak Ridge Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8--06--88.

Samplee Preparation Data

idia banfillikul	Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
Bigilipegawgjipin-	88081692	DANGB2-MW13-SS1	BA-I	8-05-88		9-07-88	
ī	88081692	DANGB2-MW13-SS1	CD-I	8-05-88		9-07-88	
*	38081692	DANGB2-MW13-SS1	CR-I	8-05-88		9-07-88	
- निर्मा विक्रातान्तिका	88081692	DANGB2-MW13-SS1	PB-F	8-05-88		9-13-88	
T TOTAL	88081692	DANGB2-MW13-SS1	418.1	8-05-88	8-29-88	8-31-88	
	88081692	DANGB2-MW13-SS1	MOIS	8-05-88		8-15-88	
in 7 km	88081692	DANGB2-MW13-SS1	8010	8-05-88		8-16-88	8-16-88
HATER ALDER	88081692	DANGB2-MW13-SS1	8020	8-05-88		8-16-88	8-16-88
-	88081692	DANGB2-MW13-SS1	8270	8-05-88	8-16-88	9-15-88	
ial.	88081693	DANGB2-MW13-SS3	BA-I	8-05-88		9-07-88	
CHRISTING IN	88081693	DANGB2-MW13-SS3	CD-I	8-05-88		9-07-88	
2	88081693	DANGB2-MW13-SS3	CR-I	8-05-88		9-07-88	
.	88081693	DANGB2-MW13-SS3	PB-F	8-05-88		9-13-88	
FPS NAMED A THIRD	88081693	DANGB2-MW13-SS3	418.1	8-05-88	8-29-88	8-31-88	
188	88081693	DANGB2-MW13-SS3	MOIS	8-05-88		8-15-88	
	88081693	DANGB2-MW13-SS3	8010	8-05-88		8-16-88	8-16-88
(S 84)	88081693	DANGB2-MW13-SS3	8020	8-05-88		8-16-88	8-16-88
gnafingskettelen og	88081693	DANGB2-MV13-SS3	8270	8-05-38		9-18-88	
400.	88081694	DANGB2-MW13-SS4	BA-I	8-05-88		9-07-88	
ege-	88081694	DANGB2-MW13-SS4	CD-I	8-05-88		9-07-88	
	88081694	DANGB2 \rightarrow 1W13-SS4	CR-I	8-05-88		9-07-88	
3		DANGB2-MW13-SS4	PB-F	8-05-88		9-13-88	
	88081694	DANGB2-MW13-SS4	418.1	8-05-88	8-29-88	8-31-88	
and a	88081694 88081694	DANGB2-MW13-SS4	MOIS	8-05-88		8-15-88	
	88081694	DANGB2-MW13-SS4	8010	8-05-88		8-16-88	8-16-83
	88081694	DANGB2-MW13-SS4	8020	8-05-88		8-16-88	8-16-88
ar garageag of	88081694	DANGB2-MW13-SS4	8270	8-05-88		9-18-88	

Job No.: OR001.00

Project: Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8-11-88.

Sample Preparation Data

Laboratory	Client	Wa a b	Date collected	Date*	Date	Date*
Sample No.	Sample ID	Test		extracted	analyzed	2nd col.
88081695	DANGB8-MW18-SS1	BA-I	8-05-88		9-07-88	-
88081695	DANGB8-MW18-SS1	CD-I	8-05-88		9-07-88	
88081695	DANGB8-MW18-SS1	CR-I	8-05-88		9-07-88	
88081695	DANGB8-MW18-SS1	PB-F	8-05-88		9-13-88	
88081695	DANGB8-MW18-SS1	418.1	8 - 05-88	8-29-88	8-31-88	
88081695	DANGB8-MW18-SS1	MOIS	8-05-88		8-15-88	
88081695	DANGB8-MW18-SS1	8010	8-05-88		8-16-88	8-16-88
88081695	DANGB8-MW18-SS1	8020	8-05-88		8-16-88	8-16-88
88081695	DANGB8-MW18-SS1	8080	8-05-88		9-18-38	
88081696	DANGB8-MV18-SS2	BA-I	8-05-88		9-07-88	
88081696	DANGB8-MW18-SS2	CD-I	8-05-88		9-07-88	
88081696	DANGB8-MW18-SS2	CR-I	8-05-88		9-07-88	
88081696	DANGB8-MW18-SS2	PB-F	8-05-88		9-13-88	
88081696	DANGB8-MW18-SS2	418.1	8 - 05-88	8-29-88	8-31-88	
88081696	DANGB8-MW18-SS2	MOIS	8-05-88		8-15-88	
88081696	DANGB8-MW18-SS2	8010	8-05-88		8-16-88	8-17-88
88081696	DANGB8-MW18-SS2	8020	8-05-88		8-16-88	8-17-88
88081696	DANGB8-MV18-SS2	8080	8-05-88		9-18-88	
88081697	DANGB8-MW18-SS3	BA-I	8-05-88		9-07-88	
88081697	DANGB8-MW18-SS3	CD-I	8-05-88		9-07-88	
88081697	DANGB8-MW18-SS3	CR-I	8-05-88		9-07-88	
88681697	DANGB8-MW18-SS3	PB-F	8-05-88		9-13-88	
88081697	DANGB8-MW18-SS3	418.1	8-05-88	8-29-88	8-31-88	
88081697	DANGB8-MW18-SS3	MOIS	8-05-88		8-15-88	
88081697	DANGB8-MW18-SS3	8010	8-05-88		8-17-88	8-17-88
88081697	DANGB8-MW18-SS3	8020	8-05-88		8-17-88	8-17-88
88081697	DANGB8-MW18-SS3	8080	8-05-88		9-18- 3	

^{*} If applicable

信仰を見るのかないない。

Thresholdstand

Job No.: OR001.00

Project:

Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8-11-88.

Sample Preparation Data

-							
, 1	Laboratory	Client		Date	Date*	Date	Date*
	Sample No.	Sample ID	Test	collected	extracted	analyzed	2nd col.
₹	88081698	DANORS MUSO OCI	9010	0 05 00		0.16.00	0 17 00
		DANGB8-MW20-SS1	8010	8-05-88		8-16-88	8-17-88
ì	88081698	DANGB8-MW20-SS1	8020	8-05-88		8-16-88	8-17-88
	88081698	DANGB8-MW20-SS1	8080	8 - 05-88		9-18-88	
٠	88081699	DANGB8-MW20-SS2	BA-I	8-05-88		9-07-88	
	88081699	DANGB8-MW20-SS2	CD-I	8-05-88		9-07-88	
	88081699	DANGB8-MW20-SS2	CR-I	8-05-88		9-07-88	
i	88081699	DANGB8-MW20-SS2	PB-F	8-05-88		9-13-88	
	88081699	DANGB8-MW20-SS2	418.1	8-05-88	8-29-88	8-31-88	
į	88081699	DANGB8-MW20-SS2	MOIS	8-05-88		8-15-88	
í	88081699	DANGB8-MW20-SS2	8010	8-05-88		8-18-88	8-17-88
	88081699	DANGB8-MW20-SS2	8020	8-05-88		8-17-88	8-17-88
š	88081699	DANGB8-MW20-SS2	8080	8-05-88		9-18-88	
2	88081700	DANGB8-MV20-SS4	BA-I	8-05-88		9-07-88	
ì	88081700	DANGB8-MW20-SS4	CD-I	8-05-88		9 -07- 88	
	88081700	DANGB8-MW20-SS4	CR-I	8-05-88		9-07-8 8	
The same of	88081700	DANGB8-MW20-SS4	PB-F	8-05-88		9-13-88	
	88081700	DANGB8-MW20-SS4	418.1	8-05-88	8-29-88	8-31-88	
	88081700	DANGB8-MW20-SS4	MOIS	8-05-88		8-15-88	
1	88081700	DANGB8-MW20-SS4	8010	8-05-88		8-17-8 8	8-17-88
(Negative	88081700	DANGB8-MW20-SS4	8020	8-05-88		8-17-88	8-17-88
4	88081700	DANGB8-MW20-SS4	8080	8-05-88		9-18-88	

* If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88081692-88081700
WORK ORDER NO.: 816

These soil samples were received at the ES Berkeley Laboratory on 8-06-88. They were received cold and intact, except for 1-L amber jar of DANGB8-MW20-SS1 which was received broken. Sample DANGB8-MW20-SS4 (88081700) was received with this batch of samples but was not listed on the Chain-of-Custody. It was analyzed for the same tests as the other samples as per phone conversation with K. Davis on 8-08-88.

The chain of custody for samples 88081695-88081700 requested analysis by EPA Method 8270. The samples were extracted by this protocol. After the extraction holding time for these samples had expired, the requested analysis was changed to EPA Method 8080. The only difference in extraction procedure between these two methods is the surrogate(s) used. In order to avoid extraction out of holding time, the 8270 extracts were used for analysis by Method 8080. Since the pesticide surrogate was not added during the extraction process, no pesticide surrogate recovery is available for these samples.

PAGE 1

ANALYSIS REPORT

WORK ORDER NUMBER:

816

BOB NUMBER : 280000000440

WORK ORDER DATE : 08/08/88

APPROVED BY Chlis Knock

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

CAK RIDGE, TN 37830

SILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

IASK: 2, UNITS: mg/Kg

DANGB2-MW13-SS1 DANGB2-MW13-SS3 DANGB2-MW13-SS4 DANGB8-MW18-SS1 DANGB8-MW18-SS2 DANGB8-MW18-SS3

SHOW AND SHOULD	-IEST COMPOUND	88081692	88081693	88081694	88081695	88081696	88081697
5 22 2	ACID DIG SOIL	NA	NA	NA	NA	NA	NA
Augmente	3ARIUM	54.9	38.2	58.7	31.8	51.1	70.7
į	CADMIUM	11.1N	10.1N	11.0N	10.1N	11.5N	10.3N
	CHROMIUM	31.3N	28.3N	26.0N	25.6N	40.5N	30.3N
-	_EAD	10.9SN	3.3SN	3.8SN	3.6SN	5.3N	5.3SN

IA- NOT ANALYZED ND - Not Detected

ENGINEERING-SCIENCE INC. 12/19/88 PAGE 2

ANALYSIS REPORT FOR WORK ORDER NUMBER 816

SK: 2, UNITS: mg/kg

DANGB8-MW20-SS2 DANGB8-MW20-SS4

.ST COMPOUND	88081699	88081700
ID DIG SOIL	NA	NA
RIUM	56.5	27.2
ADMIUM	9.0N	11.0N
ROMIUM	30.2N	24.9N
:AD	4.9N	3.2N

⁴⁻ NOT ANALYZED

^{) -} Not Detected

ENGINEERING-SCIENCE INC. 12/19/88

PAGE 3

ANALYSIS REPORT

NORK ORDER NUMBER: 816

108 NUMBER : ZB0000000440

WORK ORDER DATE : 08/08/88

REPORT DATA:

LES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

E DAK RIDGE, TN 37830 BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT : BILL HAYDEN

(615)-481-3920

TASK: 3, UNITS: mg/KG

DANGBZ-MW13-SS1 DANGBZ-MW13-SS3 DANGBZ-MW13-SS4 DANGB8-MW18-SS1 DANGB8-MW18-SS2 DANGB8-MW18-SS3

	COMPOUND	88081692	88081693	88081694	88081695	88081696	88081697
7	1 PETROLEUM HYDROCARBONS	<100	<100	<100	<100	160	<100
	ISTURE	10.1	8.1	8.1	6.0	12.5	12.9

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/19/88

PAGE 4

ANALYSIS REPORT FOR WORK ORDER NUMBER 816

\SK: 3, UNITS: mg/KG

DANGB8-MU20-SS2 DANGB8-MU20-SS4

EST COMPOUND	88081699	88081700
18.1 PETROLEUM HYDROCARBONS	<100	<100
MOISTURE	16.5	8.3

ENGINEERING-SCIENCE INC. 12/19/88

ANALYSIS REPORT

HORK ORDER NUMBER:

FORK ORDER : ZBO000000440

APPROVED BY

WORK ORDER DATE : 08/08/88

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

DAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

FASK: 4, UNITS: Ug/Kg, GROUP 8010

DANGB2-MW13-SS1 DANGB2-MW13-SS3 DANGB2-MW13-SS4 DANGB8-MW18-SS1 DANGB8-MW18-SS2 DANGB8-MW18-SS3

FEST COMPOUND	88081692	88081693	88081694	88081695	88081696	88081697
BENZYL CHLORIDE	ND	ND	ND	ND	ND	ND
31S (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND	ND
BIS (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND	ND
BROMOBENZENE	ND	ND	ND	ND	ND	ND
3ROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND
3ROMOFORM	ND	ND	ND	ND	ND	ND
BROMOETHANE	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
CHLORACETALDEHYDE	ND	ND	ND	ND	ND	ND
CHLORAL	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND
CHLOROETHANE	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND
1-CHLOROHEXANE	ND	ND	ND	ND	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	ND	ND	ND	ND	ND	ND
CHLOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND	ND
CHLOROTOLUENE	ND	ND	ND	ND	ND	ND
DIBRONOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
) I BROMOMETHANE	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
DICHLOROMETHANE	9.98	4.3B	4.48	3.3B	5.18	4.4B
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND

ND - Not Detected

PAGE 6

ENGINEERING-SCIENCE INC. 12/19/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 816

.ST COMPOUND	DANGB2-MW13-SS1 88081692	DANGB2-MW13-SS3 88081693	DANGB2-MW13-SS4 88081694	DANGB8-MW18-SS1 88081695	DANGB8-MW18-SS2 88081696	DANGB8-MW18-SS3 88081697
***************************************	•••••	***********	*******	•••••		
3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND
1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
TRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND
1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
:ICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
ICHLOROFLUOROMETHANE	ND	ND .	ND	ND	ND	ND
?ICHLOROPROPANE	ND	ND	ND	ND	ND	ND
'NYL CHLORIDE	ND	ND	ND	ND	ND	ND

^{· ·} Not Detected

ENGINEERING-SCIENCE INC. 12/19/88

ANALYSIS REPORT FOR WORK ORDER HUMBER 816

ASK: 4, UNITS: ug/Kg, GROUP 8010

DANGB8-MW20-SS1 DANGB8-MW20-SS2 DANGB8-MW20-SS4

EST COMPOUND	88081698	88081699	88081700
	ND	ND	ND
			ND
IS (2-CHIOROTSOPPOPYL) STHER	Nn		ND
			ND
			ND
	_		ND
			ND
ARBON TETRACHLORIDE			ND
HLORACETALDEHYDE	ND		ND
HLORAL	ND		ND
HLOROBENZENE	ND		ND
HLOROETHANE	ND	ND	ND
HLOROFORM	ND	ND	ND
-CHLOROHEXANE	ND	ND	ND
-CUINDAETUVI VIUVI ETUED	ND	ND	ND
HLOROMETHANE	ND	ND	ND
HLOROMETHYL METHYL ETHER	ND	ND	ND
HLOROTOLUENE	ND	ND	ND
IBROMOCHLOROMETHANE	ND	ND	ND
IBROMOMETHANE	ND	ND	ND
,2-DICHLOROBENZENE	ND	ND	ND
,3-DICHLOROBENZENE	ND	ND	ND
,4-DICHLOROBENZENE	ND	ND	ND
I CHLOROD I FLUOROMETHANE	ND	ND	ND
,1-DICHLOROETHANE	ND	ND	ND
,2-DICHLOROETHANE	ND	ND	ND
,1-DICHLOROETHYLENE	ND	ND	ND
RANS-1,2-DICHLOROETHYLENE	ND	ND	ND
	3.4B	7.6B	3.6B
,2-DICHLOROPROPANE	ND	ND	ND
,3-DICHLOROPROPYLENE	ND	ND	ND
,1,2,2-TETRACHLOROETHANE	ND	ND	ND
,1,1,2-TETRACHLOROETHANE	ND	ND	ND
ETRACHLOROETHYLENE	ND	ND	ND
,1,1-TRICHLOROETHANE	ND		ND
,1,2-TRICHLOROETHANE	ND	***	ND
RICHLOROETHYLENE	ND		ND
			ND
	=		ND
INTL CHLOKIDE	ND	ND	ND
	ENZYL CHLORIDE ETS (2-CHLOROETHOXY)METHANE ETS (2-CHLOROETHOXY)METHANE ETS (2-CHLOROISOPROPYL)ETHER EROMOBENZENE EROMODICHLOROMETHANE EROMOFORM EROMOETHANE EARBON TETRACHLORIDE HLORACETALDEHYDE HLOROETHANE HLOROETHANE HLOROFORM -CHLOROHEXANE -CHLOROHEXANE -CHLOROMETHANE HLOROMETHANE HLOROMOCHLOROMETHANE IBROMOMETHANE J2-DICHLOROBENZENE J3-DICHLOROBENZENE J4-DICHLOROBENZENE J1-DICHLOROETHANE J1-DICHLOROETHANE J2-DICHLOROETHANE J2-DICHLOROETHANE J2-DICHLOROETHANE J1-DICHLOROETHANE NE J1-J2-TETRACHLOROETHANE J1-J2-TETRACHLOROETHANE ETRACHLOROETHYLENE J1-TRICHLOROETHANE ETRACHLOROETHYLENE RICHLOROFLUOROMETHANE RICHLOROFLUOROMETHANE	ENZYL CHLORIDE IS (2-CHLOROETHOXY)METHANE IS (2-CHLOROISOPROPYL)ETHER ND ROMOBENZENE ROMODICHLOROMETHANE ROMOFORM ROMOETHANE ARBON TETRACHLORIDE HLORACETALDEHYDE HLORACETALDEHYDE HLOROBENZENE HLOROETHANE HLOROFORM ND -CHLOROHEXANE -CHLOROETHYL VINYL ETHER HLOROFORM HLOROMETHANE HLOROTOLUENE IBROMOCHLOROMETHANE ND -2-DICHLOROBENZENE ND -3-DICHLOROBENZENE ND -1-DICHLOROBENZENE ND -1-DICHLOROETHANE ND -1-DICHLOROETHANE ND -1-DICHLOROETHANE ND -1-DICHLOROETHANE ND -1-DICHLOROPROPANE ND -1-DICHLOROPROPANE ND -1-TRICHLOROPROPANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND -1-TRICHLOROETHANE ND RICHLOROFLUOROMETHANE ND RI	IENZYL CHLORIDE IS (2-CHLOROETHOXY)METHANE ID ND IS (2-CHLOROISOPROPYL)ETHER ND ND ROMOBENZENE ND ND ROMODICHOROMETHANE ND ND ROMOFORM ROMOETHANE ND ND ROMOETHANE ROMOETHANE ND ND ROMOETHANE ROMOETHANE ND ND ROMOETHANE ND ND ROMOETHANE ND ND ROMOETHANE ND ND ROMOETHANE ND ND ROMOETHANE ND ND ROMOETHANE ROMOETHANE ND ND ROM

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/19/88

PAGE 8

ANALYSIS REPORT

ORK ORDER NUMBER: 816

38 NUMBER : 28000000440

APPROVED B

CLIENT DATA:

حببب

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

PORT DATA:

3 OAK RIDGE/DULUTH ANGB

ORK ORDER DATE : 08/08/88

0 S. ILLINOIS AVE. STE. S103

K RIDGE, TN 37830

OAK RIDGE, TN 37830

:LL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: Ug/Kg, GROUP 8020

D'NGB2-MW13-SS1 DANGB2-MW13-SS3 DANGB2-MW13-SS4 DANGB8-MW18-SS1 DANGB8-MW18-SS2 DANGB8-MW18-SS3

SST COMPOUND	88081692	88081693	88081694	88081695	88081696	88081697	
ENZENE	ND	ND	ND	ND	ND	ND	
ILOROBENZENE	ND	ND	ND	ND	ND	ND	
.2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	
.3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	
,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	
THYL BENZENE	ND	ND	ND	ND	ND	ND	
OLUENE	19	13	4.9	2.0	84	81	
?LENES	ND	ND	ND	ND	ND	ND	

ANALYSIS REPORT FOR WORK ORDER NUMBER 816

ASK: 4, UNITS: Ug/Kg, GROUP 8020

DANGB8-MW20-SS1 DANGB8-MW20-SS2 DANGB8-MW20-SS4

LEST COMPCUND	88081698	88081699	88081700
₹ "ENZENE	ND	ND	ND
# HLOROBFNZENE	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND
THYL BENZENE	ND	ND	ND
ŤOLUENE	15	120	720
XYLENES	ND	ND	ND

ENGINEERING-SCIENCE INC. 12/19/88

PAGE 10

ANALYSIS REPORT

RK ORDER NUMBER: 816

: ZB0000000440 B NUMBER RK ORDER DATE : 08/08/88

APPROVED BY

PORT DATA:

3 OAK RIDGE/DULUTH ANGB

0 S. ILLINOIS AVE. STE. S103

K RIDGE, TN 37830

LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

INTACT : BILL HAYDEN

(615)-481-3920

KSK: 4, UNITS: ug/Kg, GROUP 8080

DANGB8-MW18-SS1 DANGB8-MW18-SS2 DANGB8-MW18-SS3 DANGB8-MW20-SS1 DANGB8-MW20-SS2 DANGB8-MW20-SS4

IST COMPOUND	88081695	88081696	88081697	88081698	88081699	88081700
,DRIN	ND	ND	ND	ND	ND	ND
.PHA-BHC	ND	ND	ND	ND	ND	ND
ETA-BHC	ND	ND	ND	ND	ND	ND
ELTA-BHC	ND	ND	ND	ND	ND	ND
AMMA-BHC	NC	ND	ND	ND	ND	ND
LORDANE	ND	ND	ND	ND	ND	ND
4'-DDD	ND	ND	ND	ND	ND	ND
.41-DDE	ND	ND	ND	ND	ND	ND
4'-DDT	ND	ND	ND	ND	ND	ND
ELDRIN	ND	ND	ND	ND	ND	ND
(DOSULFAN I	ND	ND	ND	ND	ND	ND
DOSULFAN II	ND	ND	ND	ND	ND	ND
DOSULFAN SULFATE	ND	ND	ND	ND	ND	ND
DRIN	ND	ND	ND	ND	ND	ND
DRIN ALDEHYDE	NA	NA	NA	NA	NA	NA
TPTACHLOR	ND	ND	ND	ND	ND	ND
.PTACHLOR EPOXIDE	ND	ND	ND	ND	ND	ND
PONE	NA	NA	NA	NA	NA	NA
THOXYCHLOR	ND	ND	ND	ND	ND	ND
CXAPHENE	ND	ND	ND	ND	ND	ND
3B-1016	ND	ND	ND	ND	ND	ND
38-1221	ND	ND	ND	ND	ND	ND
JB-1232	ND	ND	ND	ND	ND	ND
:B-1242	ND	ND	ND	ND	ND	ND
:B-1248	ND	ND	ND	ND	ND	ND
TB-1254	ND	ND	ND	ND	ND	ND
:B-1260	ND	ND	ND	ND	ND	ND

A- NOT ANALYZED - Not Detected

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received: August 6, 1988
Date Reported: December 8, 1988

Work Order: 816 Job Number: OR001

ATTN: Mr. Bill Hayden

FOR: Address:

ES:Oak Ridge/Duluth ANGB

710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 Lab Number:
 88081692

 Sample No.:
 DANGB2-MW13

 SS1
 SS1

 Date Sampled:
 8-05-88

 Time Sampled:
 07:49

 Date Extracted:
 8-16-88

 Date Analyzed:
 9-15-88

 Percent Moisture:
 10

Compound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
1,3-Dichlorobenzene	330	ND	
1,4-Dichlorobenzene	330	ND	
Hexachloroethane	330	ND	
Bis(2-chloroethyl)ether	330	ND	
1,2-Dichlorobenzene	330	ND	
N-Nitrosodimethylamine	330	ND	
Bis(2-chloroisopropyl)ethe	r 330	ND	
N-Nitrosodi-n-propylamine	330	ND	
Hexachlorobutadiene	330	ND	
1,2,4-Trichlorobenzene	330	ND	
Nitrobenzene	330	ND	
Isophorone	330	ND	
Naphthalene	330	ND	
Bis(2-chloroethoxy)methane	330	ND	
2-Chloronaphthalene	330	ND	
Hexachlorocyclopentadiene	330	ND	
Acenaphthylene	330	ND	
Acenaphthene	330	ND	
Dimethyl phthalate	330	ND	
2,6-Dinitrotoluene	330	ND	
Fluorene	330	ND	
2,4-Dinitrotoluene	330	ND	
Diethyl phthalate	330	ND	
N-Nitrosodiphenylamine	330	ND	
Hexachlorobenzene	330	ND	

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 6, 1988 Work Order: 816
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081692
Sample No.:	DANGB2-MW13-
•	SS1
Date Sampled:	8-05-88 '
Time Sampled:	07:49
Jate Extracted:	8-16-88
Date Analyzed:	9-15-88

Percent Moisture: 10

•	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
Phenanthrene	330	ND ND	
Anthracene	330	ND	
Dibutyl phthalate	330	ND	
Fluoranthene	330	ND	
4-Chlorophenyl phenyl ether	r 330	ND	
Pyrene	330	ND	
Butyl Benzyl phthalate	330	ND	
Bis(2-ethylhexyl) phthalate	e 330	ND	
Chrysene	330	ND	
4-Bromophenyl phenyl ether	330	ND	
Benzo(a)anthracene	330	ND	
Di-n-octylphthalate	330	ND	
Benzo(b)fluoranthene	330	ND	
Benzo(k)fluoranthene	330	ND	
Benzidine	2000	ND	
3,3'-Dichlorobenzidine	660	ND	
3enzo(a)pyrene	330	ND	
Indeno(1,2,3-cd)pyrene	330	ND	
	330	ND	
Benzo(ghi)perylene	330	ND	
Benzyl Alcohol	660	ND	

Page 3 of 5

ATTN: Mr. Bill Hayden

(continued)

Date Received: August 6, 1988

Date Received: August 6, 1988 Work Order: 816
Date Reported: December 8, 1988 Job Number: OR001

For: ES:Oak Ridge/Duluth ANGB

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: 88081692

Sample No.: DANGB2-MW13
SS1

Date Sampled: 8-05-88

Time Sampled: 07:49

Date Extracted: 8-16-88

Date Analyzed: 9-15-88

Percent Moisture: 10

delicated households	Compound [Detection Limits ug/kg	Analytical Results (dry weight) ug/kg	
	Acetophenone	*	ND	-
1	Aniline	*	ND	
1	4-Aminobiphenyl	*	ND	
	4-Chloroaniline	660	ND	
	1-Chloronaphthalene	*	ND	
	Dibenzofuran	330	ND	
	p-Dimethylaminoazobenzene	*	ND	
	7,12-Dimethylbenz(a)anthrac	cene*	ND	
	a-,a-Dimethylphenethylamine		ND	
	Diphenylamine	*	ND	
	1,2-Diphenylhydrazine	*	ND	
\$	Ethyl methanesulfonate	*	ND	
ì	3-Methylcholanthrene	*	ND	
1	Methyl methanesulfonate	*	ND	
ç	2-Methylnaphthalene	330	ND	
design	1-Naphthylam ne	*	ND	
ŧ	2-Naphthylamine	*	ND	
	2-Nitroaniline	1600	ND	
	3-Nitroaniline	1600	ND	
	4-Nitroaniline	1600	ND	
	N-Nitroso-di-n-butylamine	 ★	ND	
Ī	N-Nitrosopiperidine	*	ND	
-	Pentachlorobenzene	*	ND	
ŧ	Pentachloronitrobenzene	*	ND	
r	Phenacetin	*	ND	
-	2-Picoline	*	ND	
No.	Pronamide	*	ND	
	1,2,4,5-Tetrachlorobenzene	*	ND	

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: August 6, 1988 Work Order: 816
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.:	88081692 DANGB2-MW13- SS1	
Date Sampled:	8-05-88	
Time Sampled:	07:49	
Date Extracted:	8-16-88	
Date Analyzed:	9-15-88	
Percent Moisture:	10	

Jompound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg
Alpha-BHC	x	ND
Jamma-BHC	*	ND
3eta-BHC	660	ND
Heptachlor	330	ND
Delta-BHC	500	ND
Aldrin	330	ND
Heptachlor epoxide	330	ND
Endosulfan I	*	ND
Dieldrin	500	ND
4,4'-DDE	1000	ND
Endrin	 ∗	ND
Endosulfan II	*	ND
4,4'-DDD	500	ND
4,4'-DDT	830	ND
Endosulfan Sulfate	1000	ND
Endrin aldehyde	*	ND
Endrin Ketone	*	ND
Chlordane	2000	ND
Methoxychlor	 *	ND
Toxaphene	2000	ND
Aroclor-1016	2000	ND
Aroclor-1221	2000	ND
Aroclor-1232	2000	ND
Aroclor-1242	2000	ND
Aroclor-1248	2000	ND
Aroclor-1254	2000	ND
Aroclor-1260	2000	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: August 6, 1988
Date Reported: December 8, 1988

Work Order: 816 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081692
Sample No.:	DANGB2-MW13-
;	SS1
Date Sampled:	8-05-88
Time Sampled:	07:49
Date Extracted:	8-16-88
Date Analyzed:	9-15-88
Percent Moisture:	10

Compound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	ug/kg
2-Chlorophenol	330	ND	
2-Nitrophenol	330	ND	
Phenol	330	ND	
2,4-Dimethylphenol	330	ND	
2,4-Dichlorophenol	330	ND	
2,4,6-Trichlorophenol	330	ND	
4-Chloro-3-methylphenol	660	ND	
2,4-Dinitrophenol	1600	ND	
2,6-Dichlorophenol	~-*	ND	
2-Methyl-4,6-Dinitrophenol	1600	ND	
Pentachlorophenol	1,600	ND	
4-Nitrophenol	1600	ND	
Benzoic Acid	1600	ND	
2-Methylphenol	330	ND	
3- & 4-Methylphenol	330	ND	
2,3,4,6-Tetrachlorophenol	~-*	ND	
2,4,5-Trichlorophenol	330	ND	

Harra Krell

Analyst

Laboratory Supervisor

* EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

te Received:

August 6, 1988

Work Order: 816

te Reported:

December 8, 1988

Job Number: OR001

સં :

ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

710 S. Illinois Ave, Suite F-103 iress:

Oak Ridge, TN 37830

b Number:	88081693	88081694
mple No.:	DANGB2-MW13-	DANGB2-MW13-
	SS3	SS4
te Sampled:	8-05-88	8-05-88
me Sampled:	08:31	08:47
te Extracted:	10-18-88 *	10-18-86
te Analyzed:	10-27-88	10-27-88
rcent Moisture:	8	8

mpound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
3-Dichlorobenzene	330	ND	ND	
4-Dichlorobenzene	330	ND	ND	
xachloroethane	330	ND	ND	
s(2-chloroethyl)ether	330	ND	ND	
2-Dichlorobenzene	330	ND	ND	
Nitrosodimethylamine	330	ND	ND	
s(2-chloroisopropyl)eth	er 330	ND	ND	
Mitrosodi-n-propylamine	330	ND ,	ND	
xachlorobutadiene	330	ND	ND	
2,4-Trichlorobenzene	330	ND	ND	
trobenzene	330	ND	ND	
ophorone	330	ND	ND	
phthalene	330	ND	ND	
s(2-chloroethoxy)methan	e 330	ND	ND	
Chloronaphthalene	330	ND	ND	
-xachlorocyclopentadiene	330	ND	ND	
enaphthylene	330	ND	ND	
enaphthene	330	ND	ND	
methyl phthalate	330	ND	ND	
6-Dinitrotoluene	330	ND	ND	
.uorene	330	ND	ND	
4-Dinitrotoluene	330	ND	ND	
sthyl phthalate	330	ND	NE)	
Witrosodiphenylamine	330	ND	ND	
xachlorobenzene	330	ND	ND	

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ال te Received: August 6, 1988 Date Reported: December 8, 1988 Work Order: 816 Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

Lab Number:	88081693	88081694
Sample No.:	DANGB2-MW13-	DANGB2-MW13-
· · · · · · · · · · · · · · · · · · ·	SS 3	SS4
Late Sampled:	8-05-88	8-05-88
Time Sampled:	08:31	08:47
Ite Extracted: Lite Analyzed:	10-18-88	10-18-88
te Analyzed:	10-27-88	10-27-88
Percent Moisture:	8 •	8

mpound D	etection Limits		L RESULTS reight)
量	ug/kg	ua/ka "	ug/kg
Lenanthrene	330	ND	ND
Anthracene	330	ND	ND
¶butyl phthalate	330	ND	ND
duoranthene	330	ND	ND
4-Chlorophenyl phenyl ether	330	ND	ND
gyrene	330	ND	ND
styl Benzyl phthalate	330	ND	ND
Eis(2-ethylhexyl) phthalate	330	ND	ND
Çnrysene	330	ND	ND
-Bromophenyl phenyl ether	330	ND	ND
Lanzo(a)anthracene	330	ND	ND
	330	ND	ND
[enzo(b)fluoranthene	330	ND	ND
anzo(k)fluoranthene	330	ND	ND
Benzidine	2000	ND	ND
? 3'-Dichlorobenzidine	660	ND	ND
enzo(a)pyrene	330	ND	ND
Indeno(1,2,3-cd)pyrene	330	ND	ND
Dibenzo(a,h)anthracene		ND	ND
enzo(ghi)perylene	330	ND	ND
Lenzyl Alcohol	660	ND	ND

Page 3 of 5

te Received: August 6, 1988 te Reported: December 8, 1988 Work Order: 816 Job Number: OR001

r: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

b Number:	88081693	88081694
mple No.:	DANGB2-MW13-	DANGB2-MW13-
	SS3	SS4
te Sampled:	8-05-88	8-05-88
me Sampled:	08:31	08:47
te Extracted:	10-18-88	10-18-88
te Analyzed:	10-27-88 *	10-27-88
rcent Moisture:	8	8

mpound	Detection Limits		al Results weight)
	ug/kg	ug/kg	ug/kg
etophenone	*	ND	ND
iline	*	ND	ND
Aminobiphenyl	*	ND	ND
Chloroaniline	660	ND	ND
Chloronaphthalene	-~*	ND	ND
benzofuran	330	ND	ND
Dimethylaminoazobenzene	 *	ND	ND
12-Dimethylbenz(a)anthr	racene*	ND	ND
,a-Dimethylphenethylami	.ne*	ND	ND
phenylamine	~~*	ND	ND
2-Diphenylhydrazine	×	ND	ND
hyl methanesulfonate	 *	ND	ND
Methylcholanthrene	*	ND	ND
thyl methanesulfonate	*	ND	ND
-Methylnaphthalene	330	ND	ND
-Naphthylamine	×	ND	ND
-Naphthylamine	-·-*	ND	ND
·Nitroaniline	1600	ND	ND
Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
Nitroso-di-n-butylamine	- ∗	ND	ND
Nitrosopiperidine	*	ND	ND
ntachlorobenzene	X	ND	ND
atach loronitrobenzene	~- <u>*</u>	ND	ND
.enacetin	~-*	ND	ND
-Picoline	~ - ★	ND	ND
onamide	*	ND	ND
2,4,5-Tetrachiorobenzer	1e *	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

ate Received: August 6, 1988 Work Order: 816
qte Reported: December 8, 1988 Job Number: OR001

SR: ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081693	88081694
Inple No.:	DANGB2-MW13-	DANGB2-MW13-
1 T	SS3	SS 4
ate Sampled:	8-05-88	8-05-88
ime Sampled:	08:31	08:47
ime Sampled: te Extracted: ate Analyzed:	10-18-88	10-18-88
åte Analyzed:	10-27-88 •	10-27-88
ercent Moisture:	8	8

npound	Detection Limits		TICAL RESULTS ry weight)
Profile comments	ug/kg	ug/kg	ug/kg
ipha-BHC	*	ND	ND
amma-BHC	*	ND	ND
∮ ca−BHC	660	ND	ND
L ptachlor	330	ND	ND
elta-BHC	500	ND	ND
- arin	330	ND	ND
	330	ND	ND
ndosulfan I	*	ND	ND
(eldrin	500	ND	ND .
å '−DDE	1000	ND	ND
hdrin	*	ND	ND
pdosulfan II	*	ND	ND
4'-DDD	500	ND	ND
¹ , 4 ' -DDT	830	ND	ND
ndosulfan Sulfate	1000	ND	ND
drin aldehyde	*	ND	ND
drin aldehyde drin Ketone	*	ND	ND
hlordane	2000	ND	ND
(thoxycilor	*	ND	ND
thoxycilor xaphene roclor-1016	2000	ND	ND
roclor-1016	2000	ND	ND
roclor-1221	2000	ND	ND
Spcior-1232	2000	ND	ND
Foctor-1242	. 2000	ND	ND
roc10r-1248	2000	ND	ND
ocior-1254	2000	ND	ND
oclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

te Received: August 6, 1988 te Reported: December 8, 1988 Work Order: 816 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

aress:710 S. Illinois Avé, Suite F-103

Oak Ridge, TN 37830

: Number:	88081693	88081694
mple No.:	DANGB2MW13-	DANGB2-MW13-
	\$\$3	SS4
te Sampled:	8-05-88	8-05-88
me Sampled:	08:31	08:47
te Extracted:	10-18-88	10-18-88
.te Analyzed:	10-27-88	10-27-88
rrent Moisture:	8	8_

pourd	Detection Limits	ANALYTICA (dry w	L RESULTS eight)	, All tie Aut in, 400
	ug/kg	ug/kg	ug/kg	
-Inlorophenol	330	ND	ND	
-Kitrophenol	330	ND	ND	
.enol	330	ND	ND	
4-Dimethylphenol	330	ND	ND	
4-Dichlorophenol	330	ND	ND	
4,6-Trichlorophenol	330	ND	ND	
-Chloro-3-methylphenol	660	ND	ND	
.4-Dinitrophenol	1600	ND	ND	
.:-Dichlorophenol	*	ND	ND	
-Mathyl-4,6-Dinitrophenol	L 1600	ND	ND	
entachlorophenol	1600	ND	ND	
-Nitrophenol	1600	ND	ND	
enzoic Acid	1600	ND	ND	
-Mathylphenol	330	ND	ND	
- 4 4-Methylphenol	330	ND	ND	
.3,4,6-Tetrachlorophenol	*	ND	ND	
4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

.

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

JTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

SUMMARY	
RESULTS	ETALS
CONTROL	MET
QUALITY	

Constitution of the same

The second

Job No.:	OR001	UC Report No:	AAF-S-0023-88
	ES Oak Bidge	Sample Matrix: Conc. Unit:	Soll mg/KG
Attn:	Bill Hayden	Date Received:	8-02-88
Address:	710 S, Illinois Avenue	Date Reported:	9-20-88
,	Suite F-103	Dilution ractor:	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Oak Ridge, In. 37830	ZHOISTONE:	5.8

QC Report for Laboratory Sample No(s): 88081661-88081664 88081692-88081700 Project:

Duluth ANGB

Laboratory Supervisor Approval:

Analyte	Laboratory Duplicates	Analyte Laboratory Sample Nos. Duplicates Spike	Date Anal	Date Prep	Anal Blank Method	1	C 1 D	Duplicate C1 C2 RPD SA	RPD	VS	Spike R SR	Spike Recovery SR SSR	E E
Lead	88081661	88081661	9-08-88	8-19-88	7421	7421 <0.5 6.7 6.5	6.7	6.5	æ	5.3	6.7	5.3 6.7 10.5 72N	72N

ž

If \$ moisture is reported, results are presented on a dry-wright, basis. See Legend attached. NOTE:

M = Not Applicable

大変 アラテをとなっている

QC Report No:	Sample Matrix:	Conc. Unit:	Date Received:	Date Reported:
OR001		ES Oak Ridge	Bill Hayden	710 S. Illinois Avenue
Job No.:		Client:	Attn:	Address:

ICP-S-0024-88

8-05-88 9-20-88

Dilution Factor:

#Moisture:

Date Reported:

mg/KG Soil

Duluth ANGB

Project:

Oak Ridge, In. Suite F-103

QC Report for Laboratory Sample No(s): 88081661-88081664 88081692-88081697 88081699-88081700

Laboratory Supervisor Approval:

Analyte	Laboratory	ίĎ	₩	Date	Anal	Blank	_	Ouplicate			Spike R	Recovery		
	Duplicates	Spike	Anal	Prep	Method	en minter . distribution distribution	C1	C25	RPD	SA	SR	SSR	PR	Hol.
Barium	88081661	88081661	9-07-88	8-23-88	6010	. <20	6.11.9	68.5	5	212	6.11.9	269	96	4
Cadmi um	88081661	88081661	9-07-88	8-23-88	6010	<0.5	10.9	10.4	7	5.31	10.9	13.7	533	<
Chromium	88081661	88081661	9-07-88	8-23-88	6010	<1.0	37.4	30.7	50	21.2	37.4	48.0	SON	~

1952

If # moisture is reported, results are presented on a dry-weight basis. NOTE:

See Legend attached.

See Case Narrative attached.

Percent Recovery (PR) = SSR - SR x 100

	NC = Not Calculated
C1 = Concentration One	/2 C2 = Concentration Two
Relative Percent Difference (RPD) = C1 - C2 X 100	(C1 + C2)/2

SA = Spike Added (Concentration)

4	
D	2
	`

CHAIN OF CUSTODY RECORD

Andrew of the second section of the section of

Tarananan Amerikan Am

идинитикентин

_			1	т-		Τ-	T	т	Т	Τ-	γ—	Γ-	Т			γ-			<u> </u>
SHIP TO:	ENGINEERING-SCIENCE	LABORATORY, INC. 600 Bancroft Way Berkley, CA. 97410	REMARKS		to Bosum only		1											Received by: (Signature)	
	// /F/				Sw6010 13		16											Date/Time	
SOILS ANALYSES	HEQUIRED			-	ソソ		× ¥											by: (Signature)	Romarka
		0200	01 00 MS	1	× ×	×	× ×											Relinquished	Dete/Time
	Ö.	CON	TAINERS	_	\	^	•								,			ture)	story by:
	h, Mn.	Renevon	PTION	155-	155.	. 55 x	- 535											Received by: (Signe	Received for Labor (Signature)
PROJECT NAME/LOCATION	Duluth ANGB/Duluth, Mn.	SAMPLENIS; (Signalury) Att Change worm	SAMPLE DESCRIPTION	DANGES-MW20-55	DANCES-11620- 551	-DAWGBS-MWZU- 552	8 - MIM 20 - 55 2											8-5-97 1735	Date/Time
PROJECT NA	Duluth	Signature)		DAKGE														Religaulahed by: (Signature)	Relinquished by: (Signature)
Ž.	01	Mes; c	TIME	15 45	1545	1605	1605			,								er g	tq peus
ES JOB NO.	OR001	SAMPLE	DATE	185.8 .	18-5-8	5-5-8i	5-5-34								19	53		Religay	1901 1901

Distribution: Original Accompanies Shipment. Copy to 1. rdinator Field Files

		<u>;</u>	1					1.1	.	ļ		1	
868932522		and a Prieme Phoneser (Navy bresser	iriment/Floor No.		47:0	•	. P parimag dIZ	Federal Express Use Base Charges	Declared Value Charge	Other 1	Other 2	PART #204173800	500
8. 19. E. E. E. E. E. E. E. E. E. E. E. E. E.	SENDER'S COPY		deg	1.)(C. A. 1 10°	TDEX Address Here	## P	ECLARED VALUE	ment to the service conditions anesticine upon request. See within the company.	THE STREET OF STREET OF THE STREET, COURT OF THE STREET, COURT OF THE STREET, COURT OF THE STREET OF	Now ages 1,0 rook or homes, of the control of the c	FOR THE STATE OF T	ontes Federal Express to deliver this ship- al dolaming a delivery signifier end their and hold harmless Federal Express from any leig therefrom.
PACKAGE. TRACKING NUMBER	SENDER	ime) Please Print	11 300	Cos (The Connect Budget to P.S. Bours	. 1. 1	IF MOLD FOR PICK-UP, Print FEDEX Address Mere Speed	-	SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY	Use of the ambicommission speem in our curent Service Guide which is a back of service scopy of the ambitor to	The set not be responsible for any co- package, shades he read of their, the unless you specily a hoper amount in B par addisors \$100 specified and docu- of their Missions.	Federal Espesia Service Gods appy. Your Federal Espesia for this of the service, velocity as the tops of safet, excesse, respect, profit, all any office form of demogra-should devolute	to be left in no event sted you come	Sender authorites Federal Exprinent without observing a deliver information and hold harmless Federal seasons resulting transfrom.
Little coulor		To (Recopent s Name) Please Print	8 11 8 11	Eucl Swell	\$ T. Y.	2.5		FILE SERVICES			Total	September 1	Dex use
AIRBILL INTERNATION INTERNATIO		Number (Very Important	/Floor No.	•	٠	tirst 24 characters will appear on invoice)	Like Become con	6 PICLAGES WINE	02 /		Tour Tour	Referred At 1 Theouler Stop 2 Con-Call Stop 3 Con-Call Stop BS Con-Call Stop	FFDEX Corp Embloyee No.
1 1361 1 1361 1 1361	ي بر	Your Phone Num	Department/Floor No.	•	ZP Property	IARACTERS WILL AT	Die 3rd Pany Fradia Acct No.	RELITERY AND SPECIAL HANDLING	HOLD FOR PICK-UP FOLLOWS	DELIYER SATURBAT CO.	CHESTAL SHATCHLANCE SERVICE (CSS)	OTHER SPECIAL SERVICE	And Company Patrickly
BL89838781	* · · · ·	4-17	- . 	1	1-		Aca No	DELITERY AND	, [] were ,	3 DELIVER SATURD	١٥٥		o Cateronal merun
1 868	4 207-	Please Prof		1. FII.	7.11.12	YOUR BILLING REFERENCE INFORMATION	andar DA Pacapearis Fude.	SEAVICES	, 6 🗆 erreger	043	Ġ		
	Sencer's Federal Expr	From (Your Name)	Company	Street Address	- Ö	YOUR BILLING A	PAYMENT Com Sensor	35	1 K Emoury !	2 COUNCE-PAI	3 C BOXERBREAT	4 O TUBE	S STANBAAB AM Obsery not the ear
				4	λd	ဝ၁	S	N.		NE .	5.89	889	 272
		C			•) (1)	7	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(*) (*)	· · / ·		, •,•,•,•,•,•,•

	(_	١
	(1	1
	(_)
	()
	L	Ī) -
	(ĭ	-
		_	
,	i	_)
	ĺ		رّ
	Ì	_	•
	1	_	
		,)
	(_)
	L	ı	
	Č	_	Š
	ä	2	
	*	_	;
	1	4	Ļ
	•	I	_
	i	,	5

ON BOT SE	NO	PROJECT NAM	PROJECT NAME/LOCATION						SOILS		ANALYSES		SHIP TO:	Γ
OR001	101	Duluth	Duluth ANGB/ Duluth, Mn.	th, Mn.	ŏ		1			REOUINED	NE D	ENGI	ENGINEERING-SCIENCE	
SAMPLE	EM(S): (S	SAMPLERIS): (Signature)		Remanue	CON-	\ <u>``</u>	•					600 Ban Berkley,	600 Bancroft Way Berkley, CA. 97410	<u> </u>
DATE	TIME		SAMPLE DESCRIPTION	RIPTION	TAINERS	OPOPMS		N YOU	OI OP MS	Terry			REMARKS	
8.5.8	640	DANCB2	DANGB2 - MW 13-55	/ 5	\	1	1	 -						
66-2-3.	14:0	232NAC	2 - MW13-551	-55/	\		×	X	7		5we010	210 15	Ar Barlum ont	
86.5.8	1882	· DAKCB2	- simm-	5 \$ 3	\	×		 				٠		
CIS · S 83	1,8 3/	PANEBA	PAKEBZ - MW13 -	-553			X	*	×		2		11	
8 5 56	6847	DAKG 82	- 81 ~14' -	455	\	¥		_						
\$ 5.5	1.147	DANC 82	- MW13 -	554	/ .		7	7	- +		7		1)	
98.3.8	34(1	DANG138-, MW18	- 81-1W-	1 55	`	λ								
88 S. S.	1348	30 2N4C	81 mln -	- 531	,		ען	とと	4		<i>,,</i>		,	
6.3.3	1432	- \$ SI 9NHU	81711	-352	\	<i>≻</i>								
(R 5 3)	7432	, &1 2NVQ	DAKE 13 8 - AIWIR -	-552	/		¥ .	K	×		μ		./	
44 Sel	25-1	179.A.C. (3 s	285- \$1 WA - 835AA	553	/	×								
\$ - \$ - \$	1.32	りんんららい	- 81 0111/- 1	- 555	/ _		Y	χ χ	¥		<i>λ</i> , .		1,	
Relinquished		by: (Signature)	8-5-38 (7.35	Received by: (Signature)	iture)	Relinquished by: (Signature)	P → U = I	by: (uđiš i	• tura		Date/Time F	Received by: (Signature)	
Relinqui	kq peus	Relinquished by: (Signature)	Dete/Time	Received for Labora (Signature)	borstory by:	0	Date/Time		Remarks	a •				

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

192	و معلسون		2	ip in			2	Federal Express Use	Velue Charge			17.00 17.00	A COMPANY	<u>!</u>
1922988999	*		Department/Floor No.		77	. Here	ZIP Paramed		Trees Se Declared V	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	One 2	Total Charges malling response to the country part See PART (2017)	600	
	SENDER'S COPY			4. + f	₩)	rint FEDEX Address Herr	i	Service compitions, decianed falbe	2.52	And the species of the second	And the same of th	100 or the deciment vehicle sciently excited your act extend Expense will be you in remoperation charges on	Express to define the ship- definery signature and ships as federal Express from any	
PACKING NUMBER	SEND	Property of the state of the st	1. 7,9; 1.		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	W MOLD FOR PICK-UP, Print FEDEX A.		TINCE CONDETION	Carte Service Class of the art	And the proposed by a series of the property o			Buffronzes Federal Wood observing B. Ay and hold hamila nauling Branshom.	,
		cipient's Name) PA	نىلى <u>.</u> ئىلا	Street Address (The	一方の		8					15		-
INVESTIGATION OF A SALES AND MANAGE STREET AND MANAGE STREET OF SALES AND MANAGE STREET AND MANAGE STR		Contacting To (Rection	S .	Energy S	8	OICE.)	PRO SERVICE COM	ATTENDED LESSON	37		Total / Som	The paler Sup	FEDEX Corp. Employee No.	Date/Time for FEDEX Use
MIRBILL THE COLUMN THE COLUM	:	ing Number (Nery line	Department/Floor No.		ZIP Propried	(first 24 characters will appear on invoice.)		PREZ.A623	上:		8	Personal Property of the Party	FEDEX	Oake/ Lym
MALENTS ML POR SM OLL FREE.	X	Your Phone No.	Department of the second of th	100		ARACTERS WILL	De sa sa Pany Fadis Aces No.	DELIYERY AND SPECIAL NANDLING	MOLD FOR PICK-UP	DELIYER SATURDAY	CONSTRUCT STRUCTURES STRUCT (CSS)	BTHER SPECIAL STRING	48-15A	•
ESTENSION OF THE PROPERTY OF T	ري د د د		,Ā) 1			IN (FIRST 24 CH	Great Na.	DELIVERY AND	· Dwate ra	S BELIVER SA			S C Survey rect-ge] -
. BES	Account Number	Panel .		TILL	7.1.1	VCE INFORMATIL	D 348 Pacicionits Fed		3 STERMENT		_			
	i i i i i .	a Name) Passa			ラッド	BILLING REFERENCE INFOR	100	SEAMCES	Comments.	WAREP-PAR 7	Edment +	POETHWENT 9	STANDARD TO THE	
	3	£	8	See Address	8		Tana Market	A		35				.
					λd	00	S	¥.			5	889	261	•
	٦.,	O				1' 0'	• 56	?		?. .		ì	•	<i>5</i> ~

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY Samples No.: 88081661-88081664 Samples No.: 88081692-88081697 Samples No.: 88081699-88081700 QC REPORT NO.: ICP-S-0024-88

The results obtained for the laboratory control sample (LCS) analyzed with these samples for the analytes Cadmium, Ciromium and Barium exceeded the recommended EPA recoveries. All data associated with this batch was closely inspected and no analytical problems were found. The initial and continuing calibration verification standards and blanks and precision and accuracy recoveries were within acceptable limits with the following exceptions:

Chromium and Cadmium spike recoveries were below acceptable limits and were followed by analytical spike as required by laboratory standard operating procedure. The results of the analytical spike recovery for Chromium were within acceptable ranges. The results of the analytical spike recovery for Cadmium indicate matrix interference for this analyte.

1

The same of

ENVIRONMENTAL QUALITY PARAMETERS QUALITY CONTROL RESULTS SUMMANY PETROLEUM HYDROCARBONS

Job No.:	OR001 C	QC Report No:	TPH-S-0042-88
. Y.		Sample Matrix:	Soil
Client:		Conc. Unit:	ing /kg
Attn:		Date Received:	8-08-88
Address:	710 S. Illinois Avenue	Date Prepared:	88-67-8
		Date Analyzed:	8-31-88
		Date Reported:	9-00-88
	T	Dilution Factor:	0.0

Laboratory Supervisor Approval:

#Moisture:

QC Report for Laboratory Sample No(s): 88081692-88081700, 88081706-88081708, 88081709

Duluth ANGB

Project:

Laboratory Sample No.	Anal Method	Blank	SR	SA	ટાન	. br	MSD	PR	RPD	Notes
88081692	418.1	< 100	< 100	1110	830	75	760	68	5	*

If I moisture is reported, results are presented on a dry-weight basis.

1958

	MS = Spike Sample ' MSD = Spike Duplicate
NOTE: THE PROPERTY OF STATE OF	* Percent recovery is within ES control limits. Relative Percent Difference (RPD) = MS - MSD X 100
	ı

Percent Recovery (PR) =
$$SSR - SR \times 100$$
 SR = $SR = SR \times 100$ SR = $SR = SR \times 100$

in propagation of

The same of the sa

CALL IN SEC.

A STATE OF

7525

EPA 8010/8020

VGC-S-0034-88

Sample Matrix:

QC Report No:

OR001 Job No.: ES Oak Ridge Bill Hayden

710 S. Illinois Avenue

Address:

Client: Attn:

37830 Oak Ridge, Tn. Suite F-103

Dilution Factor: Date Reported: Date Prepared: Date Analyzed: % Moisture:

8-22-88 9-12-88

8-10-88 ug/KG Soil

Date Received:

Conc. Unit:

Laboratory Supervisor Approval:

Duluth ANGB

Project:

qc Report for Laboratory Sample No(s):
88081661-88081664, 88081706-88081709

1.1. shoretory		 						ES	
יין דישטטן שנטן א	7	 2 -	Z/ N	20	CVW	. PR	COAR	RPD	*Reco
Sample No.	Compound	 5 	2	=	}	:		-	
		_		-		***************************************	and the state of t		

Laboratory Sample No.	Compound	VS	SR	W.S.		MSD	PR I	RPD	F ES RPD	QC Limits #Recovery
	Halocarbons: 8010	ere van 100		gas kan ser-		****		,	*** 5=	
1 88081735	 1,1-dichloroethane	11.3	QN .	9.73	98 -	9.81	1 87	 #	8 4	58-124
	Trichloroethene Chlorobenzene		S ON ON	9.30	- -	9.31	82	r, 2	212	71-125
	Aromatics: 8020				~- ·				*****	
88081735	Benzene	11.3	QN C	10.1	89	10.2	90	- ^	26	75-123
- -	Toluene Chlorobenzene	1.3	ND ND	8.37	****	8.37	****	0	#2	82-112

The quality control sample is from a different Martin Marietta project. If # moisture is reported, results are presented on a dry-weight basis. See Case Narrative attached. NOTE:

(MS + MSD)/2 MS - MSD ## Relative Percent Difference (PR)

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result

- SR x 100

Percent Recovery (PR) = (MS or MSD)

Not Applicable Not Calculated Not Detected 11 11 11 S

Spike Added (Concentration)

QC-FRM3S

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
Samples No.: 88081700, 88081706-88081707
QC REPORT NO.: VGC-S-0034-88

Samples 88081700 and 88081706 were analyzed initially as low soils. They were reanalyzed as medium soils due to the high acetone content. The results reflect the medium level analysis for acetone and the low level analysis for all other target compounds. Accordingly, both low and medium level blanks were required.

Sample 88081707 was lost after the 8240 analysis but before ϵ moisture determination was done. Thus, the results are reported on a wet weight basis.

Percent recoveries for toluene and chlorobenzene in 8020 series do not meet the ES QC limits. Blank spike analysis showed the laboratory to be in control.

SUMMARY
BLANK S
METHOD

- Propriessantes

Autoministration a

plumant post

Fritzenberg)

Proprietamentalism -

OR001 Job No: Client: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, Tn. 37830

Duluth ANGB Project:

ug/KG 9-12-88 Soil Sample Matrix: Conc. Unit: Date Reported:

Laboratory Supervisor Approval:

Inclusive Sample Nos.	88081661-88081664 88081692-88081699	88081707-88081709	
CRDL	0.25	0.25	
Conc	0.89	5.5	
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane	
CAS Number	75-09-2 67-66-3	75-09-2	
Instru- ment ID	Carbopack 75-09-2	 Carbopack 75-09-2 	
Fraction	VGC	ΛGC	
Date Analyzed	8-16-88	8-17-88	
File ID	050	690	1961

	Sample Matrix: Medium soil Conc. Unit: ug/KG Date Reported: 9-12-88 Laboratory Supervisor Approval:	tax	Inclusive Sample Nos.	88081700, 88081706	
	trix: t: rted: / Superv	114112000	CRDL	2.5	
	Sample Matrix: Conc. Unit: Date Reported: Laboratory Sup	11.11	Conc	7.8	
			Compound (HSL, TIC or Unknown)	Dichloromethane	
			CAS {	75-09-2	
Avenue 37830			Instru- ment ID	Carbopack 75-09-2	
	idge den 1linois Ave 103 e, Tn. 37	NGB	e, in. 37	Fraction	VGC
08001	ES Oak Ridge Bill Hayden 710 S. Illinois A Suite F-103 Oak Ridge, Tn.	Duluth ANGB	Date Analyzed	8-17-88	
Job No:	Client: Attn: Address:	Project:	File ID	8b 1962	

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Job No:

ORO01

QC Report No.:

OCP-S-0042-88

Client: ES Oak Ridge QC Sample No.: Level (Low/Med): Low

88081707

Attn:

Bill Hayden

Date Reported:

11-04-88

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s).:

ALVBunlo

88081706-88081710, 88081695-88081700,

88081749-88081754

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2000	ND	63.4	95	46-127
Heptachlor	2000	ND	63.7	96	35-130
Aldrin	2000	ND	62.3	94	34-132
Dieldrin	5000	ND	173	104	31-134
Endrin	5000	ND	166	100	42-139
4,47-DDT	5000	ND	155	93	23-134

	MSD Conc.	WOD 50	MS % Rec. #	% RPD #	QC Limits	
	In Extract (ug/Kg)	MSD % Rec. #			RPD	REC
Lindane	53.1	80	95	18	50	46-127
Heptachlor	54.3	82	96	16	31	35-130
Aldrin	54.1	81	94	14	43	34-132
Dieldrin	145	87	104	18	38	31-134
Endrin	141	85	100	16	45	42-139
4,47-DDT	128	77	93	19	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 6 outside limits

Spike Recovery: 0 out of 12 outside limits

^{*} Values outside of QC limits

PESTICIDE METHOD BLANK SUMMARY

Job No.:

OR001

Lab Name: Engineering Science

Lab Sample No.:

Blank

Client:

ES Oak Ridge

Attn: Bill Hayden

Matrix:

Soil

Address:

710 S. Illinois Avenue

Level (low/med):

Low

Suite F-103

Oak Ridge, Tn. 37830

Extraction:

(SepF/Cont/Sonc): Sonc

Project:

Duluth ANGB

Date Extracted:

9-16-88

Date Analyzed (1): 9-18-88

Time Analyzed (1): 09:24

Date Analyzed (2): Time Analyzed (2):

Instrument ID (1): 5890 #2

Instrument ID (2):

GG Column ID (1): OV-1

GC Column ID (2):

This Method Blank applies to the following samples, MS and MSD.

EFA Sample No.	Lab Sample ID (1)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2	!
- - - -	88081695 88081696 88081697 88081699 88081700	9-18-88 9-18-88 9-18-88 9-18-88 9-18-88			!
					;
					1

CASE NARRATIVE QUALITY CONTROL RESULTS SUMMARY QC REPORT NO.: OCP-S-0042-88

These samples (WO# 816, 819, 833) were analyzed using protocols from EPA Method 8080 instead of CLP pesticides. The only difference is that a five point calibration is performed at the start of a series of analyses, thus there is no evaluation check standard for linearity. Note that there were no compounds found and confirmed.

The samples in work orders 816 and 819 were extracted for analysis by EPA Method 8270, as requested on the chain of custody. This request was changed to pesticides by the client. Thus, no pesticide surrogate standard was added.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

The analytical results for Sample No. 85081707 is provided on a wet weight basis, since percent moisture was not performed.

12.50

Parketters:

h futed the ...

a paper programme mentioners of the first of the final particular and the second sections of the second

Job No.:	ORO 01	Sample Matrix:	Soil
		Conc. Unit:	ug/KG
Client:	ES Oak Ridge	Work Order No:	816
Attn:	Bill Hayden	Lab Sample ID:	Blank
Address:	710 S. Illinois Avenue	Lab File ID:	S0082
	Suite F-103	Date Received:	NA
	Oak Ridge, Tn. 37830	Date Extracted:	8-16-88
		Date Analyzed:	9-20-88
	•	Date Reported:	12-12-88
Project:	Duluth ANGB	Dilution Factor:	None
		% Moisture:	NA
# TICs Found:	15		

Laboratory Supervisor Approval:

MBurlos

- Unknown 3.95 19 - Unknown 4.35 20 - Unknown 4.47 24 - Unknown 5.52 13 - Unknown 5.96 240 - Unknown 7.35 27 - Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11 - Unknown 37.89 11					
- Unknown 4.35 20 - Unknown 4.47 24 - Unknown 5.52 13 - Unknown 5.96 240 - Unknown 7.35 27 - Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	_	Unknown	3.95	19	
- Unknown 4.47 24 - Unknown 5.52 13 - Unknown 5.96 240 - Unknown 7.35 27 - Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	-				
- Unknown 5.52 13 - Unknown 5.96 240 - Unknown 7.35 27 - Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	-				
- Unknown 5.96 240 - Unknown 7.35 27 - Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	-				
- Unknown 7.35 27 - Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	_				
- Unknown 20.26 23 - Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	-				
- Unknown 25.22 5.0 - Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	_				
- Unknown 30.09 36 - Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	-				
- Unknown 30.31 31 - Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	-				
- Unknown 34.76 7.9 - Unknown 35.16 37 - Unknown 37.89 11	_				
- Unknown 35.16 37 - Unknown 37.89 11	•••				
- Unknown 37.89 11	-				
	_				
	-	Unknown	38.08	32	
- Unknown 43.06 7.4	-				

Job No.:	ORO01	Sample Matrix:	Soil
		Conc. Unit:	ug/KG
Client:	ES Oak Ridge	Work Order No:	816
Attn:	Bill Hayden	Lab Sample ID:	88081692
Address:	710 S. Illinois Avenue	Lab File ID:	S0062
	Suite F-103	Date Received:	8-08-88
	Oak Ridge, Tn. 37830	Date Extracted:	8-16-08
	- '	Date Analyzed:	9-15-88
		Date Reported:	12-12-88
Project:	Duluth ANGB	Dilution Factor:	None
_		% Moisture:	NA
# TICs Found:	13		

Laboratory Supervisor Approval:

aubinde

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
-	Unknown	3.52	5.6	
-	Unknown	3.93	130	
-	C6 alkene	4.10	18	
-	Unknown	4.27	6.0	
-	Unknown	5.09	150	
-	Unknown	5.94	260	
-	Unknown	6.93	4.6	
-	Unknown	25.23	10	
-	Unknown	26.92	5.0	
_	Unknown	27.36	6.5	
-	Unknown	29.69	6.7	
-	Unknown	30.05	18	
-	Unknown	35.13	14	

Job No.:	OROO1	Sample Matrix:	Soil
		Conc. Unit:	ug/KG
Client:	ES Oak Ridge	Work Order No:	816
Attn:	Bill Hayden	Lab Sample ID:	88081693
Address:	710 S. Illinois Avenue	Lab File ID:	S0061
	Suite F-103	Date Received:	8-08-88
	Oak Ridge, Tn. 37830	Date Extracted:	10-18-88
	-	Date Analyzed:	10-27-88
		Date Reported:	12-12-88
Project:	Duluth ANGB	Dilution Factor:	None
<u>-</u>		% Moisture:	NA
# TICs Found:	9		

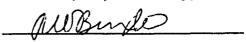
Laboratory Supervisor Approval:

AllBurk

- -	Unknown C7 alkene	3.95	160	
-	77 - 11.000		= 3 0	
	// alkene	5.04	23	
-	Unknown	5.46	18	
_	Unknown	5.98	390	
-	Unknown	7.28	7.1	
<u></u>	Unknown	25.21	5.4	
-	Unknown	30.04	20	
-	Unknown	35.13	16	
	Unknown	38.20	40	

Job No.:	OROOl	Sample Matrix: Conc. Unit:	Soil ug/KG
Client:	ES Oak Ridge	Work Order No:	816
Attn:	Bill Hayden	Lab Sample ID:	88081694
Address:	710 S. Illinois Avenue	Lab File ID:	S0060
	Suite F-103	Date Received:	8-08-88
	Oak Ridge, Tn. 37830	Date Extracted:	10-18-88
	-	Date Analyzed:	10-27-88
•		Date Reported:	12-12-88
Project:	Duluth ANGB	Dilution Factor:	None
•		% Moisture:	NA
# TICs Found:	10		

Laboratory Supervisor Approval:



CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
_	Unknown	3.91	140	
-	Unknown	5.44	16	
-	Unknown	5.90	200	
_	Unknown	7.28	10	
_	Unknown	25.21	9.0	
-	Unknown	26.98	8.5	
~	Unknown	30.05	21	
_	Unknown	30.29	17	
-	Unknown	35.14	18	
-	Unknown	38.23	100	

4 4, 5

Job No.:	OR001	QC Report No:	BNA-S-0045-88
		Sample Matrix:	Soil
Client:	ES Oak Ridge	Conc. Unit:	ug/KG
Attn:	Bill Hayden	Date Received:	8-18-88
Address:	710 S. Illinois Avenue	Date Prepared:	10-28-88
	Suite F-103	Date Analyzed:	11-02-88
	Oak Ridge, In. 37830	Date Reported:	12-08-88
		Dilution Factor:	NA
		%Moisture:	æ
Project:	Duluth ANGB		

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s):
88081887Re, 88081889, 88081939Re,
88081941Re-88081942Re, 88081955Re-88081956
88092146-88092147Re, 88092148, 88081879, 88081693Re-88081694Re

	QC Limit %Recovery	38-107	31-137	28-89	35-142	41-126	28-104	17-109	26-90	25-102	26-103	11-114	
	EPA RPD	23	61	47	36	38	27	47	35	20	33	20	
	RPD	18	80	17	10	6	8	9	12	12	13	35	
	PR	1 70	86	147*	132	146*	39	139*	85	81	145*	63	_
Re	MSD	2840	3980	5980	5370	5930	1580	11300	6910	6580	11800	5120	
88081694	PR	58	90	124*	120	133*	36	130*	9/	7.2	128*	90	
Re-88081956 88081879, 88081693Re-88081694Re	MS	2370	3660	5040	4880	5410	1460	10600	6140	5840	10400	7320	
5Re-88081956 88081879, 8	SR	Æ	S S	£	2	ND	QN	QN —	Q	Q.	S	QN	
· 1/2	VS	0907	0907	4060	4060	090%	090%	8130	8130	8130	8130	8130	
E8081941Re-88081942Re, 8808195 E8092146-88092147Re, 88092148,	Compound	1.2.4-Trichlorobenzene	Acenaphthene	2.4-Dinitrotoluene	Pyrene	N-N1 rroso-di-n-Propylamine	1,4-Dichlorobenzene	Pentachlorophenol	Phenol	2-Chlorophenol	4-Chloro-3-Methylphenol	4-Nitrophenol	
404	Fraction		8/8	Laboratory	Sample #	8808194286			ACTD	Laboratory	Sample #	88081942Re	
197	'0												_

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

See Case Narrative attached.

NA = Not Applicable	NC = Not Calculated	ND = Not Detected	
			SA = Spike Added (Concentration)
Relative Percent Difference (RPD) - MS - MSD X 100	(MS + MSD)/2		Percent Recovery (PR) = (MS or MSD)-SR x 100

Percent Recovery (PR) = (MS or MSD)-SR x 100 SA QC FRMIS

88-A1-DULU0641 1

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

. J

	rix: Soil	
QC Report	Sample Matrix:	Conc. Unit
OR001		ES Oak Ridge
Job No.		Client:

710 S. Illinois Avenue Suite F-103 Bill Hayden

> Address: Attn:

37830 Oak Ridge, In.

Duluth ANGB

Project:

Laboratory Supervisor Approval:

11-02-88 10-28-88

Date Received:

Date Prepared: Date Analyzed:

12-03-88

Dilution Factor:

"Moisture:

Date Reported:

150 Report for Laboratory Sample No(s): 38081887Re, 8808188

88081887Re, 88081889, 88081939Re, 88081941Re

38081942Re, 88091955Re-88091956, 88092146 38092147Re, 88092148, 88081879, 88081693Re-88081694Re

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit %Recovery	. 1
■ ••••	1,2,4-Trichlorobenzene	3330	GN	2600	87	2300	69	12	23	38-107	-
B/::	Acenaphthene	3330	Ð	2630	6/	2200	99	18	61	31-137	
Laboratory	2,4-Dinitrotoluene	3330	QN ON	2870	98	2900	87		47	28-89	
Sample #	Pyrene	3330	QN	3130	56	2930	88	7	36	35-142	
Bl.nrk	N-Nitroso-di-n-Propylamine	3330	NO OX	3430	103	2830	85	19	38	41-126	
N outs	1,4-Dichlorobenzene	3330	QN Q	2130	99	1800	54	17	27	28-104	-/-1
	Pentachlorophenol	0299	ON	6520	86	0209	91	7	47	17-109	
ACLD	Phenol	0299	QN	3870	58	3240	84	18	35	26–9 0	-
Laboratory	2-Chlorophenol	0299	£	4200	63	3800	57	10	20	25-102	
Sample #	4-Chloro-3-Methylphenol	0299	ND	0019	91	6170	92		33	26-103	
Blank	4-Nitrophenol	0299	Q.	1590	24	066	15	94	20	11-114	
" 11 · 31.	If " mainting is recented recented on a dry-weight backs	ro procont	o do	dry-weight	hacte						•

% moisture is reported, results are presented on a dry-weight basis. = COLE:

MS = Spike Sample	MSD = Spike Duplicate	SR = Sample Result
Relative Percent Difference (RPD) = $MS - MSD \times 100$	(MS + MSD)/2	

NA = Not Applicable NC = Not Calculated ND = Not Detected

SA = Spike Added (Concentration)

88-A1-DULU0642 1

Percent Recovery (PR) = (MS or MSD)-SR x 100

٧S

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0031-88

Car Spire

OR001 Job No.:

ES Oak Ridge Bill Hayden

Address:

Client: Attn: 710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, In. Laboratory Supervisor Approval:

10-17-88

Dilution Factor:

%Moisture:

8-05-88 8-16-88 9-19-88

ug/KG Soil

Sample Matrix:

Conc. Unit:

QC Report No:

Date Received: Date Prepared: Date Analyzed: Date Reported:

C Report for Laboratory Sample No(s):

Duluth ANGB

61 61

88081661-88081664 88081692-88081694

-											
Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA	QC Limit	
B/N Laboratory Sample # 88081661	1,2,4-Trichlorobenzene Acenaphthene 2,4-Dinitrotoluene Pyrene N-Nitroso-di-n-Propylamine 1,4-Dichlorobenzene	3540 3540 3540 3540 3540 3540	N N N N N N N N N N N N N N N N N N N	1900 2230 2150 2260 3030 1040	54 63 64 86 29	3380 2880 3150 2940 4750 2920	95 81 89 83 134*	56* 26* 38 26 44* 95*		38-107 31-137 28-89 35-142 41-126 28-104	1
ACID Laboratory Sample # 88081661	Pentachlorophenol Phenol 2-Chlorophenol 4-Chloro-3-Methylphenol 4-Nitrophenol	7090 7090 7090 7090 7090	ON ON ON ON ON	3620 4330 4220 4750 4960	51 61 60 67 70	6060 5890 5600 6450 3720	85 83 79 92 52	50* 31 28 32 32	47 35 33 50 50	17-109 26-90 25-102 26-103 11-114	1

NOTE: If 2 moisture is reported, results are presented on a dry-weight basis. See Case Narrative attached.

X 100 $= \frac{MS - \pi_{CC}}{(MS + MSD)/2}$ Relative Percent Difference (RPD)

Percent Recovery (PR) = $(MS \text{ or } MSD) - SR \times 100$

SA

MSD = Spike Duplicate SR = Sample Result SA = Spike Added (Concentration) MS = Spike Sample

NA = Not Applicable NC = Not Calculated ND = Not Detected

88-A1-PHLH0122 1

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

Job No.:	OR001	QC Report No:	BNA-S-0031-88B
		Sample Matrix:	Soil
C) tent:	ES Oak Ridge	Conc. Unit:	ug/KG
Attn:	Bill Hayden	Date Received:	NA
Address:	710 S. Illinois Avenue	Date Prepared:	8-16-88
	Suite F-103	Date Analyzed:	9-20-88
	Oak Ridge, In. 37830	Date Reported:	10-17-88
		Dilution Factor:	NA NA
		%Moisture:	NA
Project:	Duluth ANGB		

Laboratory Supervisor Approval:

::		
Sample No(s):	88081661-88081664	94
Š	816	88081692-88081694
Fe	80	80
du	<u></u>	2-8
	99	69
ŗ	381	381
ato	88(88
for Laboratory		
ap		
ב		
ţ,		
r		
Report		
Q Q	100	2
8) 	J

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit %Recovery
B/N Laboratory Sample # Blank	1,2,4-Trichlorobenzene Acenaphthene 2,4-Dinitrotoluene Pyrene N-Nitroso-di-n-Propylamine 1,4-Dichlorobenzene	3330 3330 3330 3330 3330		1490 1270 1370 1340 1920 1250	45 41 40 58 38	1370 1220 1320 1300 1880 1050	41 37 40 39 56 32	8 4 4 3 2 17	23 47 47 36 38 27	38-107 31-137 28-89 35-142 41-126 28-104
ACIU Laboratory Sample # Blank	Pentachlorophenol Phenol 2-Chlorophenol 4-Chloro-3-Methylphenol 4-Nitrophenol	6670 6670 6670 6670 6670	ON ON ON ON ON	3140 2540 2490 2910 3250	47 38 37 44 49	2760 2300 2320 2810 3080	41 34 35 42 46	13 10 7 3 5	47 35 50 33 50	17-109 26-90 25-102 26-103 11-114

NOTE: If % moisture is reported, results are presented on a dry-weight basis. See Case Marrative attached.

e NA = Not Applicable cate NC = Not Calculated It ND = Not Detected	(Concentration)
MSD = Spike Sample MSD = Spike Duplicate SR = Sample Result	SA = Spike Added (Concentration)
Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2}$ X 100	Percent Recovery (PR) = $\frac{\text{(MS or MSD)-SR} \times 100}{\text{SA}}$

METHOD BLANK SUMMARY

The second secon

OR001 Job No: Client: Attn:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, In. 37830 Address:

Duluth ANGB Project:

So 11 ug/KG 12-12-88 Sample Matrix: Conc. Unit: Date Reported:

Laboratory Supervisor Approval:

. .

METHOD BLANK SUMMARY

OR001 Job No:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Client: Attn: Address:

37830 Oak Ridge, In.

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/KG 12-12-88

Laboratory Supervisor Approval:

Duluth ANGB Project:

,			
Inclusive Sample Nos.	88081692-88081694	88081692Re-88081693Re	
CRDL	330	1	
Conc	5500	I	
Compound (HSL, TIC or Unknown)	Diethylphthalate	None Found	
CAS Number	84-66-2	į	
Instru- ment ID	1	-	
Fraction	BNA	BNA	
Date Analyzed	9-20-88	10-27-88	
File ID	S0082	80263	1975

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: BNA-S-0031-88
QC REPORT NO.: BNA-S-0031-88B
QC REPORT NO.: BNA-S-0045-88
QC REPORT NO.: BNA-S-0045-88B

Analysis of duplicate matrix spike samples for this batch showed, one recovery and five RPD's higher than EPA QC limits. A pair of spiked blanks were analyzed and the results showed the laboratory to be in control.

Analysis of samples 88081692 and 88081694 gave recoveries of two of the three base neutral surrogates that were much lower than EPA QC limits. These samples were re-extracted on 10-18-88, past the expiration of the extraction holding time. Analysis of these re-extractions showed good surrogate recoveries. The only difference in results was that dibutylphthalate was found in the original analysis and not in the re-analysis. The results of the second analysis are enclosed.

Matrix spikes that were analyzed with the re-extraction were found to have low recoveries of dichlorobenzene and high RPD's for di and trichlorobenzenes and acenaphthene. Spiked blanks were analyzed. The results showed the laboratory to be in control.

418.1 INITIAL & CONTINUING CALIBRATION DATA

Job No.:

ORO01

Calibration Date:

8-31-88

Client:

ES Oak Ridge

Instrument I.D.:

Perkin Elmer 257 Grating Infrared Spectrophotometer

Attn: Address:

Bill Hayden

710 S. Illinois Avenue

Unit:

mg/L

Suite F-103

37830 Oak Ridge, Tn.

Date Reported:

11-09-88 0.9999

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Laboratory Sample No(s).:

88081692-88081700 88081706-88081709

Concentration	Absorbance	/Continuous RF /Calibration /Verification
0.59	0.105	
1.2	0.218	RF = 5.28
1.8	0.336	
2.4	0.446	
1.20	0.221	100%
1.20	0.221	100%
•		
	0.59 1.2 1.8 2.4	0.59 0.105 1.2 0.218 1.8 0.336 2.4 0.446 1.20 0.221 1.20 0.221

GC/MS TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFTPP)

Case No. 123456

Contractor Engineering Scien Contract No. 99999999

Instrument ID #1

Date / Time 10/27/88 14:45

Lab ID >T1027::D2

Data Release Authorized By:

∎/z·	I ION ABUNDANCE CRITERIA	*RELATIVE ABUNDANCE	
51	30.0 - 60.0% of mass 198	39.19 OK	
68	less than 2.0% of mass 69	0.00 DK (0.00) #1	
69	mass 69 relative abundance	48.39	
70	less than 2.0% of mass 69	.54 OK (1.114) #1	
127	40.0 - 60.0% of mass 198	40.37 OK	
197	less than 1.0% of mass 198	0.00 OK	
198	base peak, 100% relative abundance	100.00 O K	
199	5.0 - 9.0% of mass 198	6.27 OK	
275	10.0 - 30.0% of mass 198	16.17 OK	
365	greater than 1.00% of mass 198	1.65 OK	
	present, but less than mass 443	7.66 OK	
	greater than 40.0% of mass 198	53.53 OK	
	1 17.0 - 23.0% of mass 442	10.49 OK (19.60) #2	

10/12/88

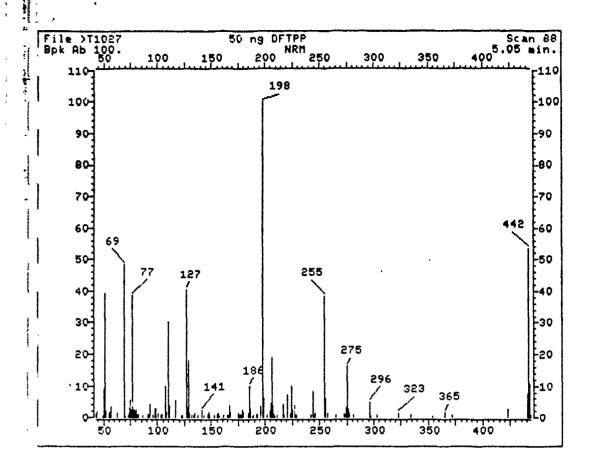
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

#1 - Value in parenthesis is % mass 69.

#2 - Value in parenthesis is 4 mass 442.

SAMPLE ID LAB_ID		TIME_OF_ANALYSIS
50 ng DFTPF >T1027	10/27/88	14:45
55TD660 50257		1 15:05
180821024117H 50258		16:17
188082132 RA SO254		17:14
88080058 RA 50260		1 18:16 +
188081947 RA 50261		1 19:16
58081879 RAY CO262		QO:15
88081693-94 32 50263		1 21:15
188081693 REX 50264		20:14
98081694 REX 508605		1 23:13
186081974 50266	10/28/88	00:13
188081975 1 50267		101:13
88081976 50268	7	102:12

fandler project



File: >T1027 Scan #: 88 Retn. time: 5.05

m/z	Int.	m/z	Int.	m/z	Int.	≥ /z	Int.	m/z	Int.
43.10	1.246	92.00	.758	146.95	1.095	192.95	1.213	246.00	1.297
44.00	1.785	93.00	4.026	147.95	1.617	196.10	3.369	255.00	38.336
49.20	.371	96.10	. 691	149.15	. 674	198.00	100.000	256.00	6.232
50.10	9.230	98.00	2.813	152.95	.842	199.00	6.266	257.90	1.533
51.10	39.195	99.00	2.628	155.05	.943	201.50	. 893	264.90	.926
52.10	2.004	101.00	1.516	156.15	1.533	204.10	2.156	272.90	1.230
55.00	1.331	103.00	.741	156.95	.455	205.10	4.514	274.05	3.251
56.00	1.668	104.00	1.044	160.95	.910	206.10	18.999	275.05	16.170
57,10	3.571	107.00	10.005	165.05	.808	207.10	3.823	276.05	2.762
63.10	1.550	108.00	1.684	165.95	.539	208.10	1.112	276.95	1.533
69.00	48.391	110.00	30.200	167.05	3.925	209.10	.472	281.05	.724
69.90	.539	111.00	3.958	167.95	1.886	211.10	. 893	295.95	4.834
73.00	.724	117.00	5.339	175.05	1.331	217.00	4.009	296.95	.556
74.10	3.200	122.05	. 623	176.05		217.90		302.95	. 623
75.00	5.659	122.95	. 825	177.05	1.162	221.00	7.125	323.05	1.583
76.10	2.425	127.05	40.374	177.95	. 623	223.10	.960	334.05	1.011
77.10	38.487	128.05	3.268	179.05	2.527	224.00	9.752	354.00	.371
78.10	2.611	129.05	17.972	180.05	1.886	225.00		364.90	1.651
79.10	2.358	130.05	1.314	185.05	1.516	227.00	3.840	372.00	. 842
80.00	2.274	132.15	.707	185.95	9.988	228.00	. 623	423.00	2.678
81.00	2.628	133.95	. 606	187.05	2.830	229.00	.775	441.05	7.664
82.00		135.05		188.05			.674		53.529
83.00	1.044	137.15		168.95		244.00		443.05	10.494
85.90		141.05		191.95		245.10		444.05	.859
91.00		143.05	. 623			-		•	

Case No:		Calibration Date: 10/27/88
Contractor: Entine	EERING. SCIENCE	Time: 15:05
Contract No:		Laboratory IO: >SO257
Instrument ID:	1	Initial Calibration Date: 10/19788

Minimum RF for SPCC is

Maximum & Diff for CCC is &

Compound	RF	RF	ZDiff	CCC	SPCC
N-Nitroso-Dimethylamine	90169	.87491	2.97		
2-Fluorophenol		1.21392	4.83		
bis(2-Chloroethyl)ether	1.11892				
Phenol		1.35680	4.22		
Pheno 1-d5		1.28661			
Aniline		.61906			
2-Chlorophenol		1.26184			
1,3-Dichlorobenzene		1.38989			
1,4-Dichlorobenzene	1.40530	1.31521	6.41		
Benzyl Chloride	-	-	-		
Benzyl Alcohol	.72906	.74567	2.28		
1,2-Dichlorobenzene	1.32240	1.43902	8.82		
2-Methylphenol	1.17367	1.34936	14.97		
3-8-4-Methy Iphenol	1.07139	1.31020	22.29		
bis(2-chloroisopropyl)Ether	2.15627	2.50651	16.24		
N-Nitroso-Di-n-Propylamine	.84050	,72370	13.90		**
Hexachloroethane	.53840	.55448	2.99		
Dibromochloropropane	-	-	-		
Nitrobenzene		.40645			
Nitrobenzene-d5		.41557			
2-Mitrophenol		. 27773			
Isaphorone		. 84469			
bis(2-Chloroethoxy)methane		.51948			
2.4-Dimethylphenol	. 34849				
Benzoic Acid	. 29725				
2,4-Dichlorophenol	.56733				
1,2,4-Trichlorobenzene	.36913				
Naphthalene		.89500			
4-Chloroaniline		.42244			
Hexachlorobutadiene			9.30		
4-Chloro-3-Methylphenol		.35759			
2-Methy Inaphthalene	.56397	. 62695	11.17		

RF - Response Factor from daily standard file at 60.00 mg/L

Form VII Page 1 of 3

RF - Average Response Factor from Initial Calibration Form VI

[#]Diff - # Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:	Calibration Date: 10/27/88				
Contractor: EnglaceElac	Time:	Time: 15:05			
Contract No:			itory ID:	>\$0257	
Instrument ID:		Initia	ıl Calibro	ation Date	10/45788
Minimum RF for SPCC is		Maxia	num ¥ Dif	f for CCC	is 2
Compound	RF	RF	#Diff	CCC SPCC	
Hexachlorocyclopentadiene	.29568	.34377	16.26	**	
2,4,6-Trichlorophenol	.42280	.41758	1.23	•	
2,4,5-Trichlorophenol	.52897	.53213	.60		
2-Fluorobiphenyl	1.27220	1.00216	14.94		
2-Chloronaphthalene	1.23784				
2-Nitroaniline		.47140			
Dimethylphthalate	1.40629	1.27616			
2,6-Dinitrotaluene		. 38642			
Acenaphthy lene	1.68918				
3-Nitroaniline	.44557	.45602	2.35		
2,4-Dinitrophenol			1.85	#4	
Acenaphthene	1.13011			•	
Dibenzofuran	1.64131				
2,4-Dinitrotoluene	.28418	. 27376	3.67		
4-Nitropheno¹		. 22553	20.73	**	
Fluorene	1.12850	.88242			
Diethylphthalate	1.20939	1.01039			
4-Chlorophenyl-phenylether		.55402			
4-Nitroaniline			1.21		
2,4,6-Tribromophenol	.21023	.22924	9.04		
1,2-Dipheny!hydrazine	-	•	-		
Alpha-BHC	-	-	-		
Beta-BHC	-	-	-		
Gamma-BHC	-	-	-		
Delta-BHC	•	-	•		
Heptachlor	-	-	-		
Aldrin	-	-	-		
N-Nitrosodiphenylamine	.40286	.46395	15.16	# ₁	
4,6-Dinitro-2-Methylphenol	.10514	-	-		
4-Bromophenyl-phenylether	.21301	. 24635	15.65		
Hexachlorobenzene	. 26273	.31606	20.30		
Pentachlorophenol	.14536	.13951	4.02		

RF - Response Factor from daily standard file at 60.00 mg/L

Form VII Page 2 of 3

RF - Average Response Factor from Initial Calibration Form VI

ZDiff - Z Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:		Calibration Date: 10/27/88
Contractor:	ENPINEERING - SCIENCE	Time: 15:05
Contract No:		Laboratory ID: >50257
Instrument ID		Initial Calibration Date: 10/47/88

Minimum RF for SPCC is

Maximum & Diff for CCC is &

Compound	RF	RF	*Diff	CCC	SPCC
Phenanthrene	1.03431	.96381	6.82		
Anthracene	1.05155	1.08903	3.56		
Di-n-Butylphthalate	1.51956	1.59943	5.26		
4,4'-Dibromobiphenyl	-	-	•		
Fluoranthene	1.19047	1.16418	2.21	*	
Heptachlor Epoxide	-	-	-		
Endosulfan I	-	-	•		
4,4'-DDE	•	-	-		
Dieldrin	-	•	-		
Endrin	-	-	-		
4,4'-DDD	-	-	-		
Endosulfan II	-	-	•		
Endrin Aldehyde	-	•	-		
4,4'-DDT	-	-	-		
Endosulfan Sulfate	-	•	-		
Dibutylchlorendate	-	-	-		
Benzidine	.04023	.13688	240.25		
Pyrene	1.56086	1.57352	81		
Terphenyl-d14	1.05835	1.13815	7.54		
Butylbenzylphthalate	1.03390	1.04490	1.06		
3,3'-Dichlorobenzidine	.13689	. 24532	79.21		
Chrysene	.99655	1.03981	4.34		
Benzo(a)Anthracene	1.10407	1.12293	1.71		
b's(2-Ethylhexyl)Phthalate	1.21073	1.25998	4.07		
Di-n-octylphthalate	3.40275	2.71179	20.31		
Benzo(a)Pyrene	1.32098	1.26310	4.38		
Benzo(b)Fluoranthene	1.60850	1.46084	9.18		
Indeno(1,2,3-cd)Pyrene	.96800	.62326	35.61		
Dibenzo(a,h)Anthracene	. 87481	1.02042	16.64		
Benzo(k)Fluoranthene		1.20620			
Benzo(q,h,i)Perylene		1.03979	15.84		

kF - Response Factor from daily standard file at 60.00 mg/L

Form VII Page 3 of 3

RF - Average Response Factor from Initial Calibration Form VI

[#]Biff - # Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name	: Engineer	ng Science		Contract:	ORØQ	<u> </u>	
Lab Code	:	Case No.:		SAS No.:		Job No.:	
Samp	le No.(Stand	dard): 557	DARG	•	Date A	malyzed:	10/27/8
Lab File	ID (Standa:	rd): <u>Sø</u>	257.		Time A	nalyzed:_	15:09
Instrume	nt ID: \	<u></u>		· / / / / / / / / / / / / / / / / / / /			
		IS1(DCB)	· · · · · · · · · · · · · · · · · · ·	IS2(NPT)	<u> </u>	IS3 (ANT)	<u> </u>
		AREA #	RT	AREA #	RT	AREA #	RT
	12 ·HOUR STD	6468	9.24	218039	12.87	144112	18.35
	UPPER		=====	=======================================	=====	========	==::===
	LIMIT	129362	9,74	436078	13.37	288224	18,85
	LOWER	32341	8.74	109020	12.37	72054	17.85
	EPA SAMPLE NO.				=====:= 		
\$605¥ 01	88082103-554 PA	63200	9,23	241935	12.83	141.381	18.34
bl 03	18682172 RA 188681947 RA	1 42313	9.24	131723	12.85	138130	8.33 8.34
	188081679 REY 18808147.44 Ry OLE	61373	9.23	250829	12.85	143083	18.34
06 کی 195 کی	188081693' REY 188081694 128x	75574	9.21	300544	12.84	150883	18.34
50 Qu	188081974	69907	4.29	152873	12.97	43560 *	18.60
u8 10	1865 1975 18808 1976	109499 67964	9.23	267839 260651	12.83	15/340 1	18.33
دم <u>۱۱</u> 12	8808 1477	<u> 68254</u>	·9.24	257292	12.84	151584	18.35
13							
15	·						i
16 17						i	i
18 19				• .			
25							
21 22					l		
	DCB) = 1.4-1 $NPT) = Naph$		nzena-d		PER LIN	IIT = + 100 standard a	
IS3 (ANT) = Acens	aphthene-da	, .		OWER LIM	IIT = -50	of
				17	cernal	standard a	

Column used to flag internal standard area values with an asterisk

page __ of __

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: Eng.	neenny Scie	nce	Contract:	ORØ	×1.	
Lab Code:	Case No.:		SAS No.:		Job No.:	
Sample No.(S	tandard): 55T	DØGG		Date A	malyzed:	10/27/88
Lab File ID (Sta	ndard): 59	125.7	· .		malyzed:_	10.
Instrument ID:						
	IS4(PHN) AREA #		IS3(CRY) AREA #		IS4(PRY) AREA #	RT
12 HOU	R 223270	23.02	157469	31.50	68590	37.68
UPPER LIMIT	446390	23.5z	314938	32.00	257180	38.18
LIMIT	111635	22.52	18735	31,∞	64295	37.18
EPA SA4 NO.	PLE .					
54 02 8 808 213 22 64 03 8 808 19 79 64 8 808 19 79 64 12 8 808 19 79 64 12 8 808 19 79 64 12 8 808 19 79 64 12	187049 187049 187049 187049 187049 1881 231394 1881 23638 1881 250643 1891 734194	23.01 23.01 23.01 23.01 23.01 23.02 23.02	146753 131492 139511 137315 150562 150464 156864 136960 136960 118092	31.49 31.48 31.49 31.49 31.49 31.49 31.50 31.50 31.50	63244 × 31807 ax 61901 × 91409 95996 95996 73547 64816 × 76466	37.71 37.70 37.67 37.67 37.69 37.80 37.70 37.73 37.71
15 15 15 15 15 15 15 15						
ISS (DRY) = 0 IS: (PRY; = P	hedanonrene-d hrysana-212 Perriasa-dl2	4	C c	f incar CVER li f incar	MIT = - 50 mal standa	ri area. % ri area.

FORM VIII 57-1

page __ of __

67 775 TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFIPP)

Case No. AD-76

Contractor EMG SCI(9/7/88)

Contract No. 99-99-99

Instrument ID 11

Date / Time 9/19/88 11:53

Lab 10 >00919::SC

Data Release Authorized By: Sawa Kuck

n/z	ION ABUNDANCE CRITERIA		XRELATIVE	RBUNDANCE
	30.0 - 60.0% of mass 198	¦	45.04 OK	
•		i		
68	i less than 2.0% of mass 69	i	0.00 OK	(0.00) #1
69	l mass 69 relative abundance	;	58.85	
70	l less than 2.0% of mass 69	1	.70 OK	(1,197) #1
127	1 10.0 - 60.0% of mass 198	1	42.88 OK	
197	i less than 1.0% of mass 198	1	0.00 OK	
198	i base peak, 100% relative abundance	1	100.00 OK	
199	1 5.0 - 9.0% of mass 198	;	7.05 OK	
275	1 10.0 - 30.0% of mass 198)	22.23 OK	
365	i greater than 1.00% of mass 198	i	1.04 OK	
441	l present, but less than mass 443	į	8.82 OK	
442	l greater than 40.0% of mass 198	1	66.68 OK	
113	1 17.0 - 23.0% of mass 442	}	12.50 OK	(18.75) #2
	1	- 1		

9/16/88: X

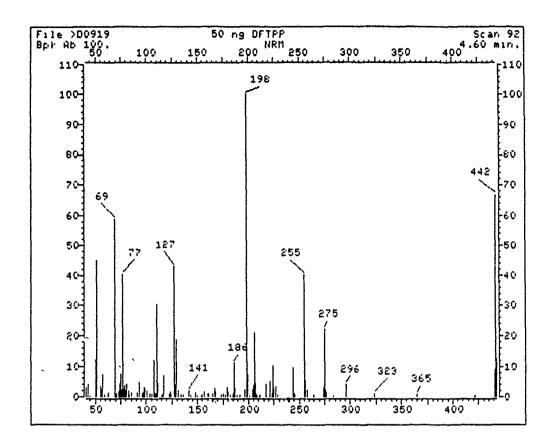
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

#1 - Value in parenthesis is X mass 69.

#2 - Value in parenthesis is X mass 442.

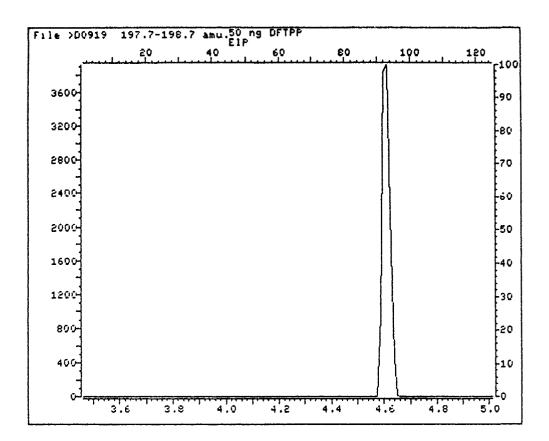
SAMPLE ID	LAB_ID	I_OATE_OF_ANALYSIS_	I_TIME_OF_ANALYSIS_:
125mg/LADN	> 85623	9/19/88	1_12:19
188081693	755634		1 <u>22:36</u> 1.
153081694	765635	· V	23:50
1			
;			
			· ·
	<u></u>		
	'	<u> </u>	1
1	' !		
!	· ·	<u> </u>	
!			
!	!		
' !	' 		
<u>'</u>	' !		·

SS and , see rext 5026 SS and , see rext 5021



File:	200919	Scan 1:	92	Retn.	time:	4.60

n/z	Int.	n/z	Int.		Int.		Int.	n/z	Int.
41.10	3.079	83.05	2.009			•	.887	226,95	3,471
43.10	3.993	83.95	.731	128.00	3.680	185.00	1.253	228.95	.887
45.00	.783	85.05	1.514	129.00	18.659	186.00	11.143	241.00	9.395
50.00	11.900	91.05	1.461	130.95	2.114	187,00	2.766	245.00	1.122
51.10	45.042	93.00	4.828	133.95	.678	188.90	.705	245.90	1.018
55.10	3.471	96.00	1,174	135.95	. 861	192.00	. 835	255.00	40.136
55.95	2.401	97.10	1.566	140.95	2.009	196.00	2.349	255.90	5.506
57.05	7.098	98.00	2.975	143.05	. 626	198.00	100.000	258.00	2.323
59.05	. 783	99.00	2.897	147.95	1.592	199.00	7.046	264.90	.757
63.05	1.487	101.00	2.035	149.85	. 339	201.40	.418	274.00	3.105
68.95	58.847	103.90	1.122	154.05	.548	203.95	2.349	275.00	22,234
69.95	.705	105.00	1.070	155.05	.887	204,95	3.810	276.00	2.349
71.05	1.435	107.00	11.352	156.05	1.644	205.95	21.112	276.95	1.435
73.05	1.801	108.00	1.461	160.05	. 992	207.05	4.332	283.05	.522
73.95	4,019	109.10	1.096	161.05	.783	207.95	1.070	295.95	4.228
74.95	7.355	110.00	30.350	165.05	1.018	208.95	.522	323.00	1.070
76.05	1.983	111.00	4,436	167.00	2.949	210.05	.444	364.95	1.044
77.05	40.162	115.00	. 365	168.00	1.775	211.05	. 678	421.00	.444
78.05	2.427	116.00	.731	173.90	.757	216.95	4.123	422.00	.261
79.05	3,706	117.00	6.811	175.00	1.044	220.95	5.193	441.05	8.820
							1.174		
81.05	4.097	123.00	1.618	178.90	3.158	224.05	10.177	443.05	12.500
82.15	1.722	124.00	. 809	180.00	1.801	225.05	2.740		



Case No:	Calibration Date: 09/19/88					
Contractor:	line: 12:19					
Contract No:		Labora		>£5623	^~	
Instrument ID:		Initia	l Calib		le: 09/19/88	
Minimum RF for SPCC is		Maxin	un X Di:	ff for CCI	I 15 I	
Conpound	RF	RF	XD1ff	CCC SPCC		
K-Mitroso-Dinethylanine	.97318	1.07635	10.60	••• ••••		
2-Fluorophenol	1.19718					
bis(2-Chloroethyl)ether	1.72380					
Phenol		1.81562				
Phenol-dS		1.55312				
Aniline		1.18157				
2-Chlorophenol		1.42093				
1,3-Dichlorobenzene		1.50763				
1,4-Dichlorobenzene		1.39931				
Benzyl Chloride		-	-			
Benzyl Ricohol	,15892	00678	95.74			
•	1,30329					
2-Methylphenol	1.07027					
3-8-4-Methylphenol	1.11935				(Conc=50.00	
bis(2-chloroisopropyl)Ether					\tolit-30.00	
K-Hitroso-Di-n-Propylamine						
Hexachloroethane		.57984				
Dibronochloropropane	- 30307		. 70			
Ki trobenzene		.52136				
Hitrobenzene-d5		. 44199				
		.23327				
2-Hitrophenol		.92254				
Isophorone						
bis(2-Chloroethoxy)nethane	. 49629		8.47			
2,4-Dimethylphenol	.31275		18.51			
Benzoic Roid	. 28274		11.84			
2,4-Dichlorophenol	. 29035		10.72			
1,2,4-Irachlorobenzene	.32164		5.60			
Kaphthalene	.84665		9.26			
4-Chloroaniline	.39615					
Hexachlorobutadiene	.18867					
4-Chloro-3-Methylphenol	.33811					
2-Methylnaphthalene	. 49672	. 55090	10.91			

RF - Response Factor from daily standard file at 25.00 mg/L

RF - Average Response Factor from Initial Calibration form VI

IDiff - I Difference from original average or curve

ECC - Calibration Check Compounds (*) SPEC - System Performance Check Compounds (**)

Case No:		Calibration Date: 09/19/88 Time: 12:19 Laboratory ID: >E5623					
Contractor:	•••••						
Contract Ho:							
Instrument ID:		Initia	l Calib	rati	on Date: ()9. * 9/88	
Minimum RF for SPCC is		Maxin	iun X Di	ff f	or EEE is	ı	
Conpound	RF	RF	XDiff	CCC	SPCC		
Hewachlorocyclopentadiene	.31256	. 34381	.36	***	**		
2,4,6-Irichlorophenol	.31771	. 37594	18,33	*			
2,4,5-Irichlorophenol		. 37594					
2-Fluorobiphenyl	1.02332	1.09018	6.53				
2-Chloronaphthalene	1.06734	1.21139	13.50				
2-Nitroaniline	. 64844	.65928	1.67				
Dinethylphthalate	1.15185	1.33718	16.09				
2,6-Dinitrotoluene	.37240	. 41438	11.27				
Acenaphthylene	1.43234	1.67392	16.87				
3-Mitroaniline	.61164	.63407	3.67				
2,4-Dinitrophenol	.21222	.12281	42.13		**		
Roenaphthene	1.00882	1.17692	16.66	¥			
Dibenzofuran	1.48405	1.55024	4,46				
2,4-Dinitrotoluene	.35416	. 39415	11.29				
1-Hi trophenol	.56574	.31555	44.22		**		
fluorene	1.16382	1.31997	13.42				
Diethylphthalate	1.29579	1.49884	15.67				
4-Chlorophenyl-phenylether		.53867					
4-Mitroaniline	.35809	. 39517	10.44				
2,4,6-Iribromophenol	.18471	. 15082	18.35				
1,2-Diphenylhydrazine	-	•	-				
Al pha-BHC	•	-	-				
Beta-BHC	-	•	•		•		
Ganna-BHE	•	•	-				
Delta-BHC	•	•	-				
Heptachlor	-	-	-				
Aldrin	-	•	•				
H-Nitrosodiphenylamine	.39351	.47145	19.81	•			
1,6-Dinitro-2-Methylphenol	.12828	.10952	14.62				
1-Bronophenyl-phenylether	. 20837	. 21622	3.77				
Hexach) or obenzene	.28398		2.80				
Pentachlorophenol	.19068	.14489	24.01				

RF - Response Factor from daily standard file at 25.00 mg/L

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) | SPEC - System Performance Check Compounds (**)

1989

Form VII Page 2 of 3

RF - Ruerage Response Factor from Initial Calibration Form UI

		Calibration Date: 09/19/88					
Contractor:	******	Tame: 12:19					
Contract No:		Labo): >E\$623			
Instrument 10:	**********	Inst	ial Calib	oration Date: 09/19.	/88		
Mininum RF for SPC	C is	Нах	inun X Dı	ff for CCC is X			
Conpound	RF	RF	XDiff	CCC SPCC			
Phenanthrene	.91670	. 97780	6.67	*** ****			
Anthracene			14,90				
Dr-n-Butylphthalate	1.56546						
1,1'-Dibromobiphenyl	1.36378						
fluoranthene	. 99605			*			
Heptachlor Epoxide	-		*	-			
Endosulfan I	-		_				
1,1'-DDE			_				
Dieldrin		_	_				
Endrin	_	_	_				
4,4'-000	_	_	-				
Endosulfan II	_	_	-				
Endrin Aldehyde	_	_	•				
1,4'-001	_		-				
Endosulfan Sulfate	_	•	•				
Dibutylchlorendate	•	-	-				
Benzidine	*	•	•				
Pyrene	.21202						
Perphenyl-d11	1.43648 1		8.74	•			
Butylbenzylphthalate	1.01113	87917	13.02				
3,3'-Dichlorobenzidine	1.01773 1						
Chrysene		15299					
Benzo(a)Anthracene	1.17468 1.						
	1.25941 1.			•			
15(2-Ethylhexyl)Phthalate	1.25969 1.		1.55				
i -n-octylphthalate enzo(a)Pyrene	2.46859 2.		16.28 *				
	1.06996 1.		4.55				
enzo(b)Fluoranthene	1.46574 1.		1,84				
ndeno(1,2,3-cd)Pyrene		46815	33.65				
1 benzo(a,h)Anthracene		59217	8.74				
enzo(k)Fluoranthene	1.00583 1.		17.78				
enzo(g,h,1)Perylene	19832	38243	23.26				

RF - Response Factor from daily standard file at 25.00 ng/L

RF - Average Response Factor from Initial Calibration Form UI

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

8B SÉMIVOLATILE INTERNAL STANDARD AREA SUMMARY

	Lab	Name				Contract:			•
., 4 ,,	Lab	Code	- ,	Case No.:		SAS No.:		SDG No.:	-
	ĔPA	Samp	le No.(Stand	dard):		•	Date 2	nalyzed:	9/19/
	Ĺab	File	ID (Standar	rd):			Time A	Analyzed:_	
	Ins	trume	nt ID:	**************************************		•			
				IS1(DCB) AREA #		IS2(NPT)			
			 		RT	AREA #	======	AREA #	
			12 HOUR	77914		279649			
			******	=======			=====	******	
			'	155828		559298		301024	
			LOWER LIMIT	38957		139824		75256	
			=========		=====	!		########	====
			EPA SAMPLE NO.	•					
	E5634	01	188081693		8.46	366041	11.97	202255	===== /J U
	ES635	02	8081694	84433	3.17	324783	11.97	184340	17.4
		03 04							
		05		·					
		06	* *************************************						
		07 08	·	<u> </u>					
		09	•						
		10			,				
		11 12	•						
· .		13							
		14							
		15 16							
		17	·						
		18							
		19 20	·						
		21					<u></u>		
•		22		İ					
			OCB) = 1,4-1 $NPT) = Naph$		nzene-d			MIT = + 100 standard a	
•			ANT) = Acen		3	Lo	OWER LIN	Standard and $STANDARD$ $STANDARD$ $STANDARD$	of
		∦ Čoli	umn used to	flag inter	rnal sta				
1		e (1991					

FORM VIII SV-1 ·

ab Name:		· · · · · · · · · · · · · · · · · · ·	Contract:		,, .	•
ab Code:	Case No.:		SAS No.:		SDG No.:	+
	(Standard):				Analyzed: 9	
ab File ID (St	andard):			Time ?	Analyzed:	
nstrument ID:	<u>B</u>					
1	IS4(PHN) AREA #		IS5(CRY)		IS4(PRY) AREA #	RT
12 HO	DUR 236404	=====	=======	****	169942	=====
UPPI LIMI	T 1399Y		429132		339884	
LOWI	128474		107294	医多种毒素	84971	
EPA SA NO EEEE 2808/6 10 8803).	 	 290729	===== 2a VA	165481	===== 2C 2n
25-35 02 <u>38/08/</u> 03	94 310993	20.02	293372	30.45	174479	35 27
05 06 07						
08 09 10 11						
12 13 14						
18 19 20 21						
22 IS4 (PHN) =	Phenanthrene-d Chrysene-dl2	10			 	

Column used to flag internal standard area values with an asteris

page __ of __

jabName: <u>la la la la la la la la la la la la la l</u>		Contr	āct:
ab Code: Cage, No.	SA!	3 No.:_	
instrument ID:CARBOPAK			
LAB FILE ID: 47,48	Înrt. Cai	lib. Ďá	tē(s):_8/
COMPOUND	RRF	RRFSO	%D
Benzyl chloride	¢oš	0.17	-115.75
bis (2-chombethoxy)	_		
mēthāne. bis (2=choroisopropyl	0.04		NÀ
	، شد	,	
êthér			NA
BromobenzeneBromodichloromethane	1.21	1.15	
Bromoform	3.56 1.20	3.43	
Bromomethane	0.18	1.12 0.20	
Carbon tetrachloride	3.18	2.97	
Chloroacetaldehyde	ERR	±. / I	ERR
Chlorobenzene	1.31	1.33	
Chloroethane	0.39	0.39	
Chloroform	4.53	4.26	
1-Chorohexaña	0.92	0.86	6.78
2-Chloroethyl vinyl ether_	0.04		NA
Chloromethane	0.22	0.32	-41.88
Chloromethyl methyl ether_			NA
o_,, m_, & p_Chlorotoluenes		3.54	
Dibromochloromethane		3.46	
Dibromomethane	2.98		12.37
1,2_Dichlorobenzene	2.35	2.30	
1,3_Dichlorobenzene		1.95	1.15
1,4_Dichlorobenzeñe Dichlorodifluormethane	2.38	2.23	6.35
1,1_Dichloroethane	0.54 2.15	2.02	NA (1 A
1,2_Dichloroethane	2.25	2.35	6.14 -4.50
1,1_Dichloroethylene	2.28	2.09	8.58
trans_1,2_dichloroethylene	1.64	1.60	2.32
Dichloromethane	6.37	3.32	47.81
1,2_Dichlöröpropane	2.06	1.81	12.27
1,3_Dichloropropylene	4.60	4.07	11.65
1,1,2,2_Tétráchlóró@than@_	6.94	6.75	2.72
1,1,1,2_Tetrāchloroēthāne_	3.6i	2.98	17.54
Tetrachloroethylene	6.94	6.75	Ź.77
1,1,1_Trichloroethane	2.21	2.13	3.84
1,1,2_Trichloroethane	4.60	4.07	11.55
Trich) proethylêne	3.97	3.87	Ž. 56
Írichlorofluorméthané Intehlorophópáné	1.90	1.70	10.43
ri-retrounhuphaue	3.59	3.11	13.28

Separation of a

VOLATILE CONTINUI	NG CALIBRAT	ION CHE	EK.		
LabName: ENGINEERI	NG SCIENCE		Contra	ict:	
-Lab Code:	Çaşê No.:	SAS	No.:	SDG	No.:
Ínstrument íD.:CA	Ř <u> </u>	ation Da	te(s):_8	6/1 6 /88_	
LAB FILE ID; RRF S	· ·	-* - *			8/15/8
markey a company of the company of the company of the			-		
CÓMROUND	RRF	RR	FŠ0. 7	&Ď	
Benzene		4.25	ã.o5		
Chlorobenzene		4.97	4.74	-4.70	
1,2_Dichlorobenze		3.48	3.17	-8.95	
1.3_Dichlorobenzo	enė <u>. </u>	3.91	3.53	-9.57	
i,4_Dichorobenze	ie <u></u>	3.65	3.24	-11.30	
Ethyl Bežené		3.06	2.95	-3.71	
Toluene		3.61	3.46	-4.31	
Xylenes		11.65	9.50	-18.44	

THATERS COMMING THE THREE	TOM RUE	L. P.	
pbName:		Çgntr	ačti
Case No. :	SAS	No.	
[strument ID: CARBORAK	Calibrat	ion Date	e(\$):_8/1 7/
LAB FILE ID: 66, 67	init. Cal	ab Dai	e (s): 8 <i>us/</i> 1
The state of the s			
The state of the s			<u> </u>
COMPOUND -	SRF	ŔŔĔĠ	% D
enzyl chloride	0.08	0.17	-112.50
lenayl chloride			
rethane	O. 04		100.00
Sther	0.26	-	100.00
industrial in the state of the	1.21	0.92	23.72
comodichloromethane	3.56	3.27	8,06
L'emoform	1.20	1.10	8.65
3romomethane	0.18	0.23	-26.78
[arbon tetrach]oride	3.18	2.84	10.57
[]loroacetal dehyde	ERR		ERR
Žhlorobenzene	1.31	1.31	
Phloroethane	0.39	o.48	-24.69
hleroform	4.53	3.93	13.32
Chorobexade	0.92	0.73	120.25
1-Chloroctavl vinyl ether_	0.04		NA .
aloromeths of	0.22	0.30	-35,62
[hloromethy] methyl ether_	0.17	*** , ***	NA
o_,m_,& p_Chldrataluenes _	3.99	3.17	20.56
(ibramach) crome inere	3.57 2.98	3.47	2.91
bromomethane	2.35	2.03 2.19	31.88 6.52
1.3_Dichlorobenzene	1.97 2.38	1.85 2.05	6.25 13.63
}4_Dichiorobenzene 	0.54	at a OO	NA
i,l_Dichlordethane	2.15	1.88	12.59
(\2_Dichloreethane	2.25	2.18	3.39
1 Dichloroethylene	2.28	2.00	12.52
irans_1,2_dichloroéthylene	1.64	1.35	17.72
የ Enloromethane	6.37	3.37	47.17
12_Dichloropropane	2.06	1.76	14.42
3_Dichioropropylede	4.60	3.47	24.66
1,1,2,2_Tetrachloroethane_	6.94	6.32	8.91
1,1,1,2_Tetrachloroethane_	3.61	2.59	28.20
Letrachlordethykene	6.94	6.32	8.89
1,1,1_Trichloroethane	2.21	2.01	9.27
[]1,2_Trkchloroethane	4.60	3.63	21.02
Fichloroethviene	3.97	3.80	4.41
irichlomöfluörmethame	- 1.90	1.62	14.86
Prich Fardaronar, e	3.59	2.76	23,24
nyl Shleride	0.91	0.86	5. 7g
! /			,
	- 7	100	

To a second

ATTLE CONTINUING CALIBRA	ATION CH	ĒČK .		_
Name: ENGINEERING SCIENCE	a great great	. ". Gantr	áct.	
Čodě: Čase No.;	SAS	No.:	SDG N	Ď::
trument ID.: Cali	.Brặtiēñ∵D	ate(s): <u>&</u>	115/88 8/17	138
FILE ID: RRF 5066			Inil capil	= 8/15/
	RRF	ŔŔĔŠQ	%Ď	-
ភិនិទីកំន <u>ំ</u>	4.25	2.63	-38.14	
lorobenzena	4.97	5.16	3.80	
2_Dichlorobenzene		2.68	-23.12	
3_Dích) orobenzêne	3.91	Ź. 99	-23.62	
4_Dichorobenzene	3.65	2.83	-22.39	
hyl Benzene	3.06	3.04	-0.52	
luene	3.61	3.47	-3.79	
îdhma	11 45	9 10	කරව වඩ	

DATA PACKAGE #32

This page intentionally left blank.

Job No.:

ORO01

Client:

ES Oak Ridge Bill Hayden

Attention: Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Attached are the analytical reports for the soil sample received by this laboratory on 8-31-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092223	DANGB-2BH1-SS6-15-17	BA-I	8-30-88		10-20-88	
88092223	DANGB-2BH1-SS6-15-17	CD-F	8-30-88		10-20-88	
88092223	DANGB-2BH1-SS6-15-17	CR-F	8-30-88		10-20-88	
88092223	DANGB-2BH1-SS6-15-17	PB-F	8-30-88		10-26-88	
88092223	DANGB-2BH1-SS6-15-17	418.1	8-30-88	9-22-88	9-23-88	
88092223	DANGB-2BH1-SS6-15-17	MOIS	8-30-88		9-09-88	
88092223	DANGB-2BH1-SS6-15-17	8010	8-30-88		9-09-88	91188
88092223	DANGB-2BH1-SS6-15-17	8020	8-30-88		9-09-88	9-11-88
88092223	DANGB-2BH1-SS6-15-17	8270	8-30-88	9-10-88	10-20-88	
88092224	DANGB-2BH1-SS7-22-24	BA-I	8-30-88		10-20-88	
88092224	DANGB-2BH1-SS7-22-24	CD-F	8-30-88		10-20-88	
88092224	DANGB-2BH1-SS7-22-24	CR-F	8-30-88		10-20-88	
88092224	DANGB-2BH1-SS7-22-24	PB-F	8-30-88		10-25-88	
88092224	DANGB-2BH1-SS7-22-24	418.1	8-30-88	9-22-88	9-23-88	
88092224	DANGB-2BH1-SS7-22-24	MOIS	8-30-88		9-09-88	
88092224	DANGB-2BH1-SS7-22-24	8010	8-30-88		9-11-88	9-09-88
88092224	DANGB-2BH1-SS7-22-24	8020	8-30-88		9-11-88	9-09-88
88092224	DANGB-2BH1-SS7-22-24	8270	8-30-88	9-10-88	10-22-88	

^{*} If applicable



Job No.:

ORO 01

Project:

Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092225	DANGB-2BH2-SS4-14-15	BA-I	8-30-88		10-20-88	
88092225	DANGB-2BH2-SS4-14-15	CD-F	8-30-88		10-20-88	
88092225	DANGB-2BH2-SS4-14-15	CR-F	8-30-88		10-20-88	
88092225	DANGB-2BH2-SS4-14-15	PB-F	8-30-88		10-17-88	
88092225	DANGB-2BH2-SS4-14-15	418.1	8-30-88	9-22-88	9-23-88	
88092225	DANGB-2BH2-SS4-14-15	MOIS	8-30-88		9-09-88	
38092225	DANGB-2BH2-SS4-14-15	8010	8-30-88		9-11-88	9-09-88
88092225	DANGB-2BH2-SS4-14-15	8020	8-30-88		9-11-88	9-09-88
88092225	DANGB-2BH2-SS4-14-151	8270	8-30-88	9-10-88	10-20-88	
88092226	DANGB-2BH2-SS5-20-221	BA-I	8-30-88		10-20-88	
88092226	DANGB-2BH2-SS5-20-22	CD-F	8-30-88		10-20-88	
88092226	DANGB-2BH2-SS5-20-221	CR-F	8-30-88		10-20-88	
38092226	DANGB-2BH2-SS5-20-22	PB-F	8-30-88		10-25-88	
88092226	DANGB-2BH2-SS5-20-22	418.1	8-30-88	9-22-88	9-23-88	
88092226	DANGB-2BH2-SS5-20-221	MOIS	8-30-88		9-09-88	
88092226	DANGB-2BH2-SS5-20-221	8010	8-30-88		9-10-88	9-11-88
88092226	DANGB-2BH2-SS5-20-22	8020	8-30-88		9-10-83	9-11-88
88092226	DANGB-2BH2-SS5-20-221	8270	8-30-88	10-29-88	11-02-88	
88092227	DANGB-2BH2-SS6-24-25	BA-I	8-30-88		10-20-88	
88092227	DANGB-2BH2-SS6-24-25	CD-F	8-30-88		10-20-88	
88092227	DANGB-2BH2-SS6-24-25	CR-F	8-30-88		10-20-88	
88092227	DANGB-2BH2-SS6-24-25	PB-F	8-30-88		10-20-88	
88092227	DANGB-2BH2-SS6-24-25	418.1	8-30-88	9-22-88	9-23-88	
88092227	DANGB-2BH2-SS6-24-25	MOIS	8-30-88		9-09-88	
88092227	DANGB-2BH2-SS6-24-25	8010	8-30-88		9-10-88	9-11-88
88092227	DANGB-2BH2-SS6-24-25	8020	8-30-88		9-10-88	9-11-88
88092227	DANGB-2BH2-SS6-24-25	8270	8-30-88	9-10-88	10-22-88	

^{*} If applicable

(SOUTHER)

ENGINEERING-SCIENCE INC. 12/09/88

PAGE 1

ANALYSIS REPORT

g fork order number:

937

10B NUMBER : 28000000440

APPROVED BY

CLIENT DATA:

WORK ORDER DATE : 09/01/88

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

IILL HAYDEN

OF REPORT COPIES: 1

:ONTRACT / PO # : ORO01

: BILL HAYDEN

(615)-481-3920

ASK: 2, UNITS: mg/Kg

DANGB, 2BH1, SS6, DANGB, 2BH1, SS7, DANGB, 2BH2, SS4, DANGB, 2BH2, SS5, DANGB, 2BH2, SS6, 15-171 22-24' 14-15' 20-22' 24-251 88092226 88092223 88092224 88092225 EST COMPOUND 88092227 NA NA NA NA ACID DIG SOIL NA 25.4 94.1 6.3N 44.5 7.8N 62.1 8.4N ARIUM 67.5 CADMIUM 8.6N 7.9N CHROMIUM 30.3 34.6 28.4 24.8 24.9 T'EAD 4.7 4.5N 11.3 4.1N 2.9

ND - Not Detected

NA - Not Analyzed

2001

ENGINEERING-SCIENCE INC. 12/09/88

PAGE 2

ANALYSIS REPORT

ORK ORDER NUMBER:

937

38 NUMBER : 280000000440 ORK ORDER DATE : 09/01/88

APPROVED BY

CLIENT DATA:

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

4K RIDGE, TN 37830

710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 3, UNITS: mg/Kg

EST COMPOUND	DANGB, 28H1, SS6,	DANGB,2BH1,SS7,	DANGB,2BH2,SS4,	DANGB,2BH2,SS5,	DANGB, 2BH2, SS6,
	15-17'	22-24'	14-15'	20-22'	24-25'
	88092223	88092224	88092225	88092226	88092227
18.1 PETROLEUM HYDROCARBONS MOISTURE	<10	16	<10	NT	<10
	7.9	8.9	9.4	7.8	7.9

ES OAK RIDGE/DULUTH ANGB (134)

- Not Detected T - Not Tested

PAGE 3

ANALYSIS REPORT

ORK ORDER NUMBER: 937

OB NUMBER : 28000000440

APPROVED BY

CLIENT DATA:

WORK ORDER DATE : 09/01/88

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

MAK RIDGE, TN 37830

OAK RIDGE, TN 37830

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

LONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/Kg, GROUP 8010

		DANGB, 2BH1, SS6,	DANGB, 2BH1, SS7,	DANGB, 2BH2, SS4,	DANGB, 2BH2, SS5,	DANGB, 2BH2, SS6,
h njules		15-17'	22-24'	14-15'	20-22'	24-25'
į	EST COMPOUND	88092223	88092224	88092225	88092226	88092227
à	RENZYL CHLORIDE	ND	ND	ND	ND	ND
1	IS (2-CHLOROETHOXY)METHANE	ND	ND	ND	NU	ND
,	LIS (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND
	BROMOBENZENE	ND	ND	ND	ND	ND
	*ROMODICHLOROMETHANE	ND	ND	ND	ND	ND
1	ROMOFORM	ND	ND	ND	ND	ND
	BROMOETHANE	ND	ND	ND	ND	ND
	CARBON TETRACHLORIDE	ND	ND	ND	ND	ND
	HLORACETALDEHYDE	ND	ND	ND	ND	ND
	HLORAL	ND	ND	ND	ND	ND
	CHLOROBENZENE	ND	ND	ND	ND	ND
	CHLOROETHANE	ND	ND	ND	ND	ND
ŧ	HLOROFORM	0.44B	1.48	1.7B	0.438	0.338
į	-CHLOROHEXANE	ND	ND	ND	ND	ND
	2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND
ŧ	THLOROMETHANE	ND	ND	ND	ND	ND
į	HLOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND
ŕ	CHLOROTOLUENE	ND	ND	ND	ND	ND
	DIBROMOCHLOROMETHANE	ND	ND	ND	ND	ND
į	IBROMOMETHANE	ND	ND	ND	ND	ND
STATES.	,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ND	ND	NO	ND	ND
Sport bear	I CHLOROD I FLUOROMETHANE	ND	ND	ND	ND	ND
100	,1-DICHLOROETHANE	ND	ND	ND	ND	ND
	1,2-DICHLOROETHANE	ND	ND	ND	ND	ND
101	1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND
45	RANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND
-32	o I CHLOROMETHANE	21B	2.13	1.5B	3.2B	1.98
	1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/09/88

PAGE 4

ANALYSIS REPORT FOR WORK ORDER NUMBER 937

AT AAMAMMA	15-17'	DANGB,28H1,SS7, 22-24'	14-15'	20-22'	24-251
ST COMPOUND	88092223	88092224	88092225	88092226	88092227
3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND
1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
TRACHLOROETHYLENE	ND	ND	ND	ND	ND
1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND
1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND
ICHLOROETHYLENE	ND	ND	ND ·	ND	ND
ICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND
1 CHLOROPROPANE	ND	ND	ND	ND	ND
NYL CHLORIDE	ND	ND	ND	ND	ND

⁻ Not Detected

PAGE 5

ANALYSIS REPORT

ORK ORDER NUMBER: 937

OB NUMBER : ZB0000000440 WORK ORDER DATE : 09/01/88

APPROVED BY _ Lab Supervisor

EPORT DATA:

CLIENT DATA:

S CAK RIDGE/DULUTH ANGB

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OAK RIDGE, TN 37830

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/Kg, GROUP 8020

EST COMPOUND	DANGB,2BH1,SS6, 15-17' 88092223	DANGB,2BH1,SS7, 22-24' 88092224	DANGE, 28H2, SS4, 14-15' 88092225	DANGB,2BH2,SS5, 20-22' 88092226	DANGB, 2BH2, SS6, 24-25' 88092227
, PENZENE	2.8	ND	ND	0.43	ND
HLOROBENZENE	ND	ND	ND	ND	ND
,,2-D1CHLOROBENZENE	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND	ND
THYL BENZENE	ND	0.44	ND	ND	ND
COLUENE	200	1.7	ND	4.0	11
XYLENES	ND	ND	ND	CM	ND

ND - Not Detected

הואטוועה האוואט - טרוויאטר

CHAIN OF CUSTODY RECORD 936-2 937-2

SAMPLE OF TANKELOCATION No. SOLICE MALVERS SHIPE OF CORNECTION No. SOLICE MALVERS SHIPE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION No. SAMPLE OF CORNECTION SAMPLE OF CORNECT				- 1	ישכי סוובססוום יאפי מ	7.57- 5
CONTROLLED CON	ES 20	E NO.	PROJECT NAME/LOCATION	Ç	SOILS ANALY	
TALL	5	1001	Duluth ANGB/Duluth, Mn.	ž	0/5/////	
1 1 1 1 1 1 1 1 1 1	SAMP	Eress: ce	gloneture)	OF	[6]	09
1845 1840 2842 285 1840 1840 1840 1840 1840 1840 1840 1855 1840 1855 1840 1855 1850 1860 1		7	استانسه	CON-	\\ \ \	Berkeley, CA.
1530 28 H 2 55 1 6-2 1	DATE	TIME	SAMPLE DESCRIPTION	TAINERS	OLE WS	
1530 2.8 Hz 5.5 2.5 6' (1/20/8	1520	ANGB 28H 2 551	-		36 60 10 BA ON
1530 2.6 Hz 5.5 2.5 -6'	1	1520	1882 551	ļ	****	
2 BH2 553 10-12 X X X X B		1530	552 5-6)	X	
1546 2642 553 10-12 1		1530	352 5-6	1.	* * *	
1546 26H2 553 10-12 1	_ 	1540	553	•	×	
1545 1544 1546 1	01	1540	2BHZ 553		XXXX	7
28112. 555 20-22 (X X X X X X X X X X X X X X X X X X	96	1545	554	_		1
2.8.12 555 20-22 1 X X X X J J J J J J J J J J J J J J J		1545	2 BH2. 584	-	×	
2842. 556 20-22 1		1550	2,8112 555)		882226 -882215
213H2_556_24-25 1 X X X X X		1550	2BHZ 555	-	X ×	
Date/Time Received by: (Signature) Date/Time Received for Laboratory by: Date/Time (Signature) Date/Time (Signature) Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Laboratory by: Subsection for Subsection for Laboratory by: Subsection for Labo		1555	356	•		
Date/Time Received by: (Signature) Date/Time Received by: (Signature) Date/Time Received for Laboratory by: Date/Time Received for Laboratory by: Date/Time Received for Laboratory by: Date/Time Received for Laboratory by: Style (Signature) Style (Signature) Style (Signature)	>	1555	556	-	×	
Date/Time Received by: (Signature) Date/Time Received by: (Signature) Date/Time Received for Laboratory by: (Signature) Date/Time Remarks Colest Interest Arch Ar						
Date/Time Received by: (Signature) Date/Time Received by: (Signature) Date/Time Received for Laboratory by: Date/Time Received for Laboratory by: Date/Time Remarks received for Laboratory by: Date/Time Remarks received for Laboratory by: Date/Time Remarks recei						
Date/Ilme Received for Laboratory by: Date/Ilme Remarks Coles	Reling	ulshed by	Date/Time Received by: (Signa		Relinquished by: (Signature)	
Date/Ilme Received for Laboratory by: Date/Ilme Remarks recief cold & 11142 of first 3 1249ecf in for 8010 /2020 only						
Pho 0202/0108 in the 8010/2020 only	Relinq	ulshed by	Date/Time Received for Labora	atory	Remarks C	colos 4 into at
		-,	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	ļ	1.56 12:00 1.00 A. S. S. S. S. S. S. S. S. S. S. S. S. S.	1 for 8010/2020 anly

ENGINEERING-JOILNIE

CHAIN OF CUSTODY RECORD 936-1 937-1

ES JOB NO.					A						Ì		
		PROJECT NA	PROJECT NAME/LOCATION			Ç				SOILS A	LS ANALYSES REGUIRED		
0040	- - - -	חמומנט	Duluth ANGB/ Duluth, Mn.	uth, Mn.		2			1		100	ENGINEERING-SCIENCE	NCE
SAMPLERIS		Signaplifes	6	,		OF		0		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		600 Bancroft Way	ن
7	7	fardir	July -	Pub Roll	. \ _	CON-		200			\ ev;	/ Berkeley, CA. 94710	**************************************
DATE	7 INE	3	SAMPLE DESCRIPTION	CRIPTION	,	TAINERS	OBOBNS	~ W	ON POS	SELLAS OLOOMS		REMARKS	
18/06/3	0191	DANG B	2841	25/	5-0	1	X	1	-			836 88880 1st St	882215
	1610	÷	1,	155	2-9	1		×-×-	シーソ	4 4	7		
	77.91	7.	-	552	2-4	1	メ					880005m x	882216
	7,620	1 7	11	512	7-2	, (* *	×	X C.f		l	7
	1630	1 7	7.3	55 #	0/-2	-	メ	·				668×3.00888	X2991
_} _}	06.97	١	1 7	55 4	8-16	~		* *	×	X X			7
20	029/		1 1	553	3-7	_	×					x1668x144660xx	819918
7	1620	1	1 ,	55,3	4-9			*	×	イデ			2
	04.9/	11	17	55.5	71-01	/	×		-			882210 x89949	
	1640	``		555	10-12	/		*	业	X	->	1	
	16640	~	1.	556	15-17)	×		-		43.7	882223 882289.	7.6
	999	ž	-	556	15-17			×	X	X		7	
	1650	٠,	٤	555	72-27	,	メ		_			882234 *800c	. A . r
2	1656	٠	<u>-</u>	5.57	h 2-22	,		X	X	X		- ·	
Retinquis	hed by: (Refinquished by: (Signature)	Dete/Time		Received by: (Signat	ature)	Relinge	Relinquished	by: ¢	by: (Signature)	_	Date/Time Received by: (Signature)	nature)
Ini	his Rody	Ţ	C130/86 18:00	Cı									
· tellnquit	hed by: ((eilnquished by: (Signature)	Date/Time		r Labor	atory by:	0	Date/Time	 	Remarks	20,0	からなっ	4 samples
				1925	Sail Frankera	,	8.3188	00:11		rad so	. SZ 	8	1

ENGINEERING-SCIENCE

CHAIN OF CUSTODY RECORD 936-1 9 33-1

OUY HECOHD 936-1, 9.39-1	SOILS ANALYSES SHIP TO:	A / EN		8 / / /	91,000	S S S S S S S S S S S S S S S S S S S		7		1	**************************************	7 X X X X X X X X X X X X X X X X X X X	いたののなど。一十一一				- -	Sagara S	6.9000 B68088	X X X X	Relinquished by: (Signature) Date/Time Received by: (Signature)		Delettime Remerks facial cold 4 intact first of samples	188 12:00 35 per 1. Buxton
r cusiony	C	·	OF.	CON		IAINERS	-			.~	~		~	_	_		-	-	~		nature) R		Laboratory by:	> :
בט אוואווט		. Mn.		a de la companya de l		TION	55/ 0-2	2-0 155	552 2-4	4-2 25	55# 5-10	55 \$ 8-16	553 (-4	7-9 5	5 (0-12	7	6 15-17	·6 15-17	12-27 2	h 2-22 L	Received by: (Signat		Received for Laborat	A.17. 4 4.7. A
A or a second second second second second second second second second second second second second second second	4E/LOCATION	Daidil ANGB/ DUIUIN, MN.	9.	- Pallollade	and the state of t	SAMPLE DESCRIPTION	2841 5	11/	11 55	11	55 12	11 55	11. 55	۲. کرنی ۱۰	11 555	۱۰ کجز کجز	۶.۶	ن. ن. 55 ف	557	5.5 -1	Date/Time	C0:31 25/08/2	Date/Time	;
	PROJECT NAME/LOCATION	Cuidill	(Signestates)	Hardio-	•		Dang B	7)	-	1.1	1 7	١	1 -	-	1	-	÷	',		٢	(Signature)	4	(Signature)	
	S JOB NO.	100110	SAMPLERISH (SI	(2)		DATE TIME	2/30/55 1610	1610	1620	7620	1630	/630	1620	1620	379	34	16/20	991	1650	V 1656	Relinquished by: (Signature)	his los	itelinquished by; (Signature)	

(1/2) トエ **9799** IF HOLD FOR PICK-UP, Print FEDEX Address New Exact Street Address (We Cleany deliver to P.G. Bazes or P.G. * Zip Codes,) SENDER'S COPY SEAVICE CONDITIONS, DECLARED VALUE しいいいつ Kathtree Killy PACKAGE TRACKING NUMBER Cricelox le/Time for FEDEX Use 12.0 DEX Corp Employ 6 TAX I our Phone Number (Very Important) YOUR BILLING REFERENCE INFORMATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE.) · 12/7 (5/~) PICKAGES 3 DELIYER WEEKDAY PAYMENT S Bu Sander 388 Perspents FedEs Acts No. 388 3rd Pary FedEs Acts No. 5 CONSTANT SURFFICIANCE SERVICE (CSS) 3 DELIYER SATURDAY amount HOLD FOR PICK-UP DELIVERY AND SPECIAL HANDLING 352588F**938** 4 DAMERROUS COOKS 37 6 | 187 82 ويون <u>۽</u> iender's Federal Express Account Number 1 S PRIGRITY ! 6 C DYERNIGHT STANDARD 10 11 INC. THE WORLD IN THE WAY å 2 COUNTER-PAK 7 C SERVICES

Q423

CASE NARRATIVE

EPA METHOD 8270 ANALYSIS

SAMPLE NO(S).: 88092223-88092227

WORK ORDER NO.: 937

These soil samples were received at the ES Berkeley Laboratory on 8-31-88. They were received cold and intact.

8270 analysis of matrix spikes showed recoveries for some of the spiked compounds that were higher than EPA QC limits in the MS. Several RPD's were also higher than EPA QC limits. Spiked blanks were analyzed. Results showed several recoveries and RPD's that were outside EPA QC limits. Since no target compounds were found in the samples associated with these matrix spikes, these high recoveries and poor precision should not adversely affect the sample results.

When samples 88092223 and 88092226 were first analyzed, two or more surrogate spike recoveries were outside of EPA QC limits. These samples were re-extracted out of holding time. Results for sample 88092223 did not change; this indicates a matrix effect. Surrogate spike recoveries for sample 88092226 were good in the second extract.

The first analysis of sample 88092224 resulted in low area counts for one or more internal standards. The sample was re-analyzed. Area counts for all internal standards were within EPA QC limits in the second analysis.

PAGE 1

ANALYSIS REPORT

WORK ORDER NUMBER:

JOB NUMBER : Z8000000440 WORK ORDER DATE : 09/01/88

APPROVED BY

Lab Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

-710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

Company of a

Borchile data

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1
CONTACT : BILL I

: BILL HAYDEN

(615)-481-3920

TASK: 2, UNITS: mg/Kg

Personal district	TEST COMPOUND	DANGB, 2BH1, \$\$6, 15-17' 88092223	DANGB,2BH1,SS7, 22-24' 88092224	DANGB, 2BH2, SS4, 14-15' 88092225	DANGB,28H2,SS5, 20-22' 88092226	DANGB, 2BH2, SS6, 24-25' 88092227
	ACID DIG SOIL	NA	NA	NA	NA	NA
Help	BARIUM	67.5	44.5	62.1	94.1	25.4
respirate	CADMIUM	8.6N	7.8N	8.4N	6.3N	7.9N
•	CHROMIUM	30.3	34.6	28.4	24.8	24.9
3	LEAD	4.7	4.5N	11.3	4.1N	2.9

ND - Not Detected

ANALYSIS REPORT

ORK ORDER NUMBER: 937

38 NUMBER : 280000000440

ORK ORDER DATE : 09/01/88

APPROVED BY ___

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

AK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT : BILL HAYDEN

(615)-481-3920

ASK: 3, UNITS: mg/Kg

	DANGB,2BH1,SS6, 15-17'	DANGB, 28H1, SS7, 22-24'	DANGB, 28H2, \$\$4, 14-15'	DANGB, 28H2, SS5, 20-22'	DANGB, 2BH2, \$\$6, 24-25'
EST COMPOUND	88092223	88092224	88092225	88092226	88092227
18.1 PETROLEUM HYDROCARBONS	<10	16	<10	NT	<10
MOISTURE	7.9	8.9	9.4	7.8	7.9

ENGINEERING-SCIENCE INC. 12/09/88

ANALYSIS REPORT

WORK ORDER NUMBER: 937

JOB NUMBER : ZB000000440

WORK ORDER DATE : 09/01/88

APPROVED BY ___ Lab Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, IN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: Ug/Kg, GROUP 8010

Company of	TEST COMPOUND	DANGB, 2BH1, SS6, 15-17' 88092223	DANGB,2BH1,SS7, 22-24' 88092224	DANGB, 2BH2, SS4, 14-15' 88092225	DANGB,2BH2,SS5, 20-22' 88092226	DANGB, 28H2, SS6, 24-25' 88092227
_	BENZYL CHLORIDE	ND	ND	ND	ND	ND
3	BIS (2-CHLOROETHOXY)METHANE	ND	ND	GN	ND	ND
AND CO	BIS (2-CHLOROISOPROPYL)ETHER	ND	ND	GN	ND	ND
	BROMOBENZENE	ND	ND	КÐ	ND	ND
:	BROMODICHLOROMETHANE	ND	ND	CM	ND	ND
Male	BROMOFORM	ND	ND	ND	ND	ND
\$	BROMOETHANE	ND	ND	ND	ND	ND
	CARBON TETRACHLORIDE	ND	ND	ND	ND	ND
,	CHLORACETALDEHYDE	,•3	ND	ND	ND	ND
-	CHLORAL	ND	ND	ND	ND	ND
4	CHLOROBENZENE	ND	ND	NO	ND	ND
	CHLOROETHANE	ND	ND	ND	ND	ND
ě	CHLOROFORM	0.44B	1.48	1.7B	0.438	0.338
ì	1-CHLOROHEXANE	ND	ND	ND	ND	ND
	2-CHLOROETHYL VINYL ETHER	ND	ND	ND	D	ND
2	CHLOROMETHANE	ND	D	ND	ND	ND
3	CHLOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND
ž	CHLOROTOLUENE	ND T	ND	ND	ND	ND
	D:BROMOCHLOROMETHANE	ND	ND	MD	ND	ND
7	DIBROMOMETHANE	ND	ND	ND	ND	ND
Park Sala	1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
3	1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,447) I CHLOROO I FLUOROMETHANE	ND	ND	ND	ND	ND
	1,1-DICHLOROETHANE	ND	ND	NO	ND	DM
•	1,2-DICHLOROETHANE	ND	ND	ND	ND	ND
ę	1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND
1	RANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND
4	131CHLOROHETHANE	218	2.18	1.53	3.28	1.98
	1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/09/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 937

EST COMPOUND	DANGB, 2BH1, SS6, 15-17' 88092223	DANGB,2BH1,SS7, 22-24' 88092224	DANGB,2BH2,SS4, 14-15' 88092225	DANGB,2BH2,SS5, 20-22' 88092226	DANGB,2BH2,SS6, 24-25' 88092227
"3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND
,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
,1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
ETRACHLOROETHYLENE	ND	ND	ND	ND	ND
1,1-TRICHLOROETHANE	ND	ND	ND	ND	סא
,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND
RICHLOROETHYLENE	ND	ND	ND	ND	ND
RICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND
RICHLOROPROPANE	ND	ND	ND	ND	ND
:NYL CHLORIDE	ND	ND	ND	ND	ND

ENGINEERING-SCIENCE INC. 12/09/88

ANALYSIS REPORT

WORK ORDER NUMBER: 937

APPROVED BY

CLIENT DAIA:

JCS NUMBER : ZB0000000440 LNORK ORDER DATE : 09/01/88

Lab Supervisor

ES OAK RIDGE/DULUTH ANGB (134)

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

FILL HAYDEN

710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1
CONTACT : BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: ug/Kg, GROUP 8020

Law Milance	TEST COMPOUND	15-17'	DANGB,2BH1,SS7, 22-24' 88092224	DANGB,28H2,\$\$4, 14-15' 88092225	DANGB,2BH2,885, 20-22' 88092226	DANGB, 2BH2, SS6, 24-25' 88092227
_	BENZENE	2.8	ND	ND	0.43	ND
ě	CHLOROBENZENE	ND	ND	ND	ND	ND
3.	1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	D	ND	ND	ND	ND
	1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
40.400	ETHYL BENZENE	ND	0.44	ND	ND	ND
1 100	TOLUENE	200	1.7	ND	4.0	11
	XYLENES	ND	ND	ND	ND	ND

ND - Not Detected

2015

ENGINEERING-SCIENCE INC. 11/04/88

PAGE 1

ANALYSIS REPORT

ORK ORDER NUMBER: 937

38 NUMBER : ZB000000440

APPROVED BY __ Lab Supervisor

ORK ORDER DATE : 09/01/88

CLIENT DATA:

EPORT DATA: S OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

ES OAK RIDGE/DULUTH ANGB (134)

AK RIDGE, TN 37830

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

CONTACT : BILL HAYDEN

(615)-481-3920

ASK: 2, UNITS: mg/Kg

EST COMPOUND	DANGB, 28H1, SS6, 15-17' 88092223	DANGB,2BH1,SS7, 22-24' 88092224	DANGB, 2BH2, SS4, 14-15' 88092225	DANGB,2BH2,SS5, 20-22' 88092226	DANGB, 2BH2, SS6, 24-25' 88092227
CID DIG SOIL	NA	NA	NA	NA	NA
ARIUM	67.5	44.5	62.1	94.1	25.4
MUIMOA	8.6N	7.8N	8.4N	6.3N	7.9N
-IROMIUM	30.3	34.6	28.4	24.8	24.9
EAD	4.7	4.5N	11.3	4.1N	2.9

ENGINEERING-SCIENCE INC. 11/04/88

PAGE 2

ANALYSIS REPORT

NORK ORDER NUMBER: 937

OB NUMBER : 280000000440

APPROVED BY

ES OAK RIDGE/DULUTH ANGB (134)

WORK ORDER DATE : 09/01/88

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, 1N 37830

CLIENT DATA:

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OR001

CONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 3, UNITS: NA

DANGB, 2BH1, SS6, DANGB, 2BH1, SS7, DANGB, 2BH2, SS4, DANGB, 2BH2, SS5, DANGB, 2BH2, SS6, 15-17' 22-24' 14-15' 20-22' 24-25' EST COMPOUND 88092224 88092225 88092226 88092227 88092223 '18.1 PETROLEUM HYDROCARBONS 9.4 7.8 7.9 MOISTURE 7.9 8.9

ND - Not Detected

ENGINEERING-SCIENCE INC. 11/04/88

ANALYSIS REPORT

RK ORDER NUMBER: 937

B NUMBER

: ZB0000000440

APPROVED BY

RK ORDER DATE : 09/01/88

Lab Supervisor

PORT DATA:

» OAK RIDGE/DULUTH ANGB

0 S. ILLINOIS AVE. STE. S103 K RIDGE, TN 37830

LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

INTACT

: BILL HAYDEN

(615)-481-3920

SK: 4, UNITS: ug/Kg, GROUP 8010

ST COMPOUND	DANGB,2BH1,SS6, 15-17' 88092223	DANGB, 28H1, SS7, 22-24' 88092224	DANGB,2BH2,SS4, 14-15' 88092225	DANGB, 2BH2, \$\$5, 20-22' 88092226	DANGB,2BH2,SS6, 24-25' 88092227
NZYL CHLORIDE	ND	ND	ND	ND	ND
S (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND
S (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND
OMOBENZENE	ND	ND	ND	ND	ND
OMODICHLOROMETHANE	ND	ND	ND	ND	ND
COMOFORM	ND	ND	ND	ND	ND
OMOETHANE	ND	ND	ND	ND	ND
RBON TETRACHLORIDE	ND	ND	ND	ND	ND
HLORACETALDEHYDE	ND	ND	ND	ND	ND
:LORAL	ND	ND	ND	ND	ND
LOROBENZENE	ND	ND	ND	ND	ND
LOROETHANE	ND	ND	ND	ND	ND
!LOROFORM	0.44B	1.4B	1.7B	0.43B	0.338
CHLOROHEXANE	ND	ND	ND	ND	ND
CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND
LOROMETHANE	ND	ND	ND	ND	ND
LOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND
LOROTOLUENE	ND	ND	ND	ND	ND
BROMOCHLOROMETHANE	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	NC·	ND	ND
2-DICHLOROBENZENE	ND	ND	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND	ND
CHLOROD I FLUOROMETHANE	ND	ND	ND	ND '	ND
1-DICHLOROETHANE	ND	ND	ND	ND	ND
2-DICHLOROETHANE	ND	ND	ND	ND	ND
1-DICHLOROETHYLENE	ND	ND	ND	ND	ND
ANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND
CHLOROMETHANE	21B	2.1B	1.5B	3.2B	1.9B
2-DICHLOROPROPANE	ND	ND	ND	ND	ND

⁻ Not Detected

ANALYSIS REPORT FOR WORK ORDER NUMBER 937

AND MINERAL LOSS .	TEST COMPOUND	DANGB,2BH1,SS6, 15-17' 88092223	DANGB,28H1,SS7, 22-24' 88092224	DANGB, 2BH2, SS4, 14-15' 88092225	DANGB,2BH2,SS5, 20-22' 88092226	DANGB,2BH2,SS6, 24-25' 88092227
undergravists.						
Š	1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND
	1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
Ţ	1,1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND
Chicago	TETRACHLOROETHYLENE	ND	ND	ND	ND	ND
SALES.	1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND
	1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND
Tulbura	TRICHLOROETHYLENE	ND	ND	ND	ND	ND
ACAL S	TRICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND
į	TRICHLOROPROPANE	ND	ND	ND	ND	ND
	VINYL CHLORIDE	ND	ND	ND	ND	ND

ANALYSIS REPORT

ORK ORDER NUMBER: 937

)B NUMBER : ZB000000440

APPROVED BY

CLIENT DATA:

ORK ORDER DATE : 09/01/88

Lab Supervisor

EPORT DATA:

3 OAK RIDGE/DULUTH ANGB 10 S. ILLINOIS AVE. STE. S103

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

\K RIDGE, TN 37830

OAK RIDGE, TN 37830

'LL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/Kg, GROUP 8020

EST COMPOUND	DANGB,2BH1,SS6, 15-17' 88092223	DANGB, 2BH1, SS7, 22-24' 88092224	DANGB,2BH2,SS4, 14-15' 88092225	DANGB,2BH2,SS5, 20-22' 88092226	DANGB,2BH2,5S6, 24-25' 88092227
ENZENE	2.8	ND	ND	0.43	ND
HLOROBENZENE	ND	ND	ND	ND	ND
, 2-DICHLOROBENZENE	ND	ND	ND	ND	ND
,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
THYL BENZENE	ND	0.44	ND	ND	ND
DLUENE	200	1.7	ND	4.0	11
'LENES	ND	ND	ND	ND	ND

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received: August 31, 1988 Work Order: 937
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: 88092227

| Sample No.: DANGB-2BH2| SS6- 24-25' |
| Date Sampled: 8-30-88 |
| Time Sampled: 15:55 |
| Date Extracted: 9-10-88 |
| Date Analyzed: 10-22-88

Percent Moisture:

Compound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
1,3-Dichlorobenzene	330	ND	
1,4-Dichlorobenzene	330	ND	
iexachloroethane	330	ND	
Bis(2-chloroethyl)ether	330	ND	
1,2-Dichlorobenzene	330	ND	
N-Nitrosodimethylamine	330	ND	
Bis(2-chloroisopropyl)ethe	r 330	ND	
N-Nitrosodi-n-propylamine		ND	
Hexachlorobutadiene	330	ND	
i,2,4-Trichlorobenzene	330	ND	
Nitrobenzene	330	ND	
Isophorone	330	ND	
vaphthalene	330	ND	
Bis(2-chloroethoxy)methane	330	ND	
2-Chloronaphthalene	330	ND	
Hexachlorocyclopentadiene	330	ND	
acenaphthylene	330	ND	
Acenaphthene	330	ND	
Dimethyl phthalate	330	ND	
2,6-Dinitrotoluene	330	ND	
Fluorene	330	ND	
2,4-Dinitrotoluene	330	ND	
piethyl phthalate	330	ND	
L-Nitrosodiphenylamine	330	ND	
Hexachlorobenzene	330	ND	

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: August 31, 1988 ate Reported: December 8, 1988 Work Order: 937 Job Number: OR001

DR: ES:Oak Ridge/Duluth ANGB

ercent Moisture:

ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number: 88092227
ample No.: DANGB-2BH2SS6- 24-25'
ate Sampled: 8-30-88
ime Sampled: 15:55
ate Extracted: 9-10-88
ate Analyzed: 10-22-88

ANALYTICAL RESULTS : ompound Detection (dry weight) Limits ug/kg ug/kg nenanthrene 330 ND athracene 330 ND ibutyl phthalate ND 330 luoranthene 330 ND -Chlorophenyl phenyl ether 330 ND 330 ND atyl Benzyl phthalate 330 ND 1s(2-ethylhexyl) phthalate 330 ND 330 arysene ND -Bromophenyl phenyl ether 330 ND enzo(a)anthracene 330 ND i-n-octylphthalate 330 ND enzo(b)fluoranthene 330 ND enzo(k)fluoranthene 330 ND enzidine 2000 ND ,3'-Dichlorobenzidine 660 ND enzo(a)pyrene 330 ND ndeno(1,2,3-cd)pyrene 330 ND ibenzo(a,h)anthracene 330 ND enzo(ghi)perylene 330 ND 660 enzyl Alcohol ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

(continued)

Page 3 of 5

Date Received: August 31, 1988
Date Reported: December 8, 1988

Work Order: 937 Job Number: OR001

For: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 Lab Number:
 88092227

 Sample No.:
 DANGB-2BH2

 SS6- 24-25'
 SS6- 24-25'

 Date Sampled:
 8-30-88

 Time Sampled:
 15:55

 Date Extracted:
 9-10-88

 Date Analyzed:
 10-22-88

 Percent Moisture:
 8

Detection Analytical Results
Limits (dry weight)
ug/kg ug/kg Limits ug/kg ug/kg Acetophenone --*
Aniline --*
[1-Aminobiphenyl --* ND 1-Chloronaphthalene ND 660 --* ND ∉ Dibenzofuran 330 ND >-Dimethylaminoazobenzene --* 7,12-Dimethylbenz(a)anthracene --* a-,a-Dimethylphenethylamine --x ND Diphenylamine ND 2,2-Diphenylhydrazine ND Ethyl methanesulfonate --- × ND 3-Methylcholanthrene ND ethyl methanesulfonate ND 2-Methylnaphthalene
1-Naphthylamine
2-Naphthylamine
2-Nitroaniline
3-Nitroaniline
11-Nitroaniline 330 ND --× ND 1600 ND 1600 ND 14-Nitroaniline 1600 ND N-Nitroso-di-n-butylamine --* ND N-Nitrosopiperidine --*
Pentachlorobenzene --*
Pentachloronitrobenzene --* ND ND ND Phenacetin ND 2-Picoline ND ?ronamide ND 1,2,4,5-Tetrachlorobenzene ND

2023

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Hatta, bor

ate Received: August 31, 1988 Work Order: 937 ate Reported: December 8, 1988 Job Number: OR001

DR: ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88092227
ample No.:	DANGB-2BH2-
	SS6- 24-25'
ate Sampled:	8-30-88
ime Sampled:	15:55
ate Extracted:	9-10-88
ate Analyzed:	10-22-88
ercent Moisture:	8

ompound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
lpha-BHC	·*	ND	
amma-BHC	~~*	ND	
∍ta-BHC	660	ND	
<pre>⇒ptachlor</pre>	330	ND	
Elta-BHC	500	ND	
ldrin .	330	ND	
eptachlor epoxide	330	ND	
ndo sulfan I	 ∗	ND	
leldrin	500	ND	
,4'-DDE	1000	ND	
ndrin	*	ND	
ndosulfan II	~~*	ND	
,4'-DDD	500	ND	
,4'-DDT	830	ND	
adosulfan Sulfate	1000	ND	
ndrin aldehyde	*	ND	
ndrin Ketone	 ★	ND	
alordane	2000	ND	
<pre>>thoxychlor</pre>	~~*	ND	
oxaphene	2000	ND	
roclor-1016	2000	ND	
roclor-1221	2000	ND	
roclor-1232	2000	ND	
coclor-1242	2000	ND	
roclor-1248	2000	ND	
coclor-1254	2000	ND	
roclor-1260	2000	ND	

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: August 31, 1988
Date Reported: December 8, 1988

Work Order: 937 Job Number: OR001

|

OR:

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 Lab Number:
 88092227

 pample No.:
 DANGB-2BH2-556-24-257

 Date Sampled:
 8-30-88

 Time Sampled:
 15:55

 pate Extracted:
 9-10-88

 Date Analyzed:
 10-22-88

 Percent Moisture:
 8

compound I	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	ug/kg
2-Chlorophenol	.330	ND	
-Nitrophenol	330	ND	
henol	330	ND	
,4-Dimethylphenol	330	ND	
2,4-Dichlorophenol	330	ND	
.,4,6-Trichlorophenol	330	ND	
:-Chloro-3-methylphenol	660	ND	
2,4-Dinitrophenol	1600	ND	
,,6-Dichlorophenol	*	ND	
-Methyl-4,6-Dinitrophenol	1600	ND	
Pentachlorophenol	1600	ND	
-Nitrophenol	1600	ND	
enzoic Acid	1600	ND	
z-Methylphenol	330	ND	
3- & 4-Methylphenol	330	ND	
,3,4,6-Tetrachlorophenol	*	ND	
,4,5-Trichlorophenol	330	ND	

Dama Kuck

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

S = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ATTN: Mr. Bill Hayden

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Work Order: 937 Date Received: August 31, 1988 Job Number: OR001 Date Reported: December 8, 1988

POR:

ES:Oak Ridge/Duluth ANGB 710 S. Illinois Ave, Suite F-103 Address:

Oak Ridge, TN 37830

Lab Number: : ample No.:	88092225 DANGB-2BH2- SS4- 14-15'	88092226 DANGB-2BH2- SS5- 20-22'
Jate Sampled:	8-30-88	8-30-88
Time Sampled:	15:45	15:50
Date Extracted:	9-10-88	10-29-88
Date Analyzed:	10-20-88	11-02-88
Percent Moisture:	9	8

Jompound	Detection Limits	ANALYTICA	L RESULTS eight)
	ug/kg	ug/kg	ug/kg
1,3-Dichlorobenzene	330	ND	ND
1,4-Dichlorobenzene	330	ND	ND
Hexachloroethane	330	ND	ND
Bis(2-chloroethyl)ether	330	ND	ND
1,2-Dichlorobenzene	330	ND	ND
N-Nitrosodimethylamine	330	ND	ND
3is(2-chloroisopropyl)ethe	r 330	ND	ND
N-Nitrosodi-n-propylamine		ND	ND
.iexachlorobutadiene	330	ND	ND
1,2,4-Trichlorobenzene	330	ND	ND
Nitrobenzene	330	ND	ND
Isophorone	330	ND	ND
Vaphthalene	330	ND	ND
Bis(2-chloroethoxy)methane	330	ND	ND
2-Chloronaphthalene	330	ND	ND
Hexachlorocyclopentadiene	330	ND	ND
Acenaphthylene	330	ND	ND
Acenaphthene	330	ND	ND
Dimethyl phthalate	330	ND	ND
2,6-Dinitrotoluene	330	ND	ND
fluorene	330	ND	ND
2,4-Dinitrotoluène	330	ND	ND
Jiethyl phthalate	330	ND	ND
N-Nitrosodiphenylamine	330	ND	ND
Hexachlorobenzene	330	. ND	ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 31, 1988 Work Order: 937
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

The state of the s

\$ 1

1

÷,

The transfer of the second of

Park Real

Lab Number:	88092225	88092226
Sample No.:	DANGB-2BH2-	DANGB-2BH2-
~ dd	SS4- 14-15'	SS5- 20-22'
Date Sampled:	8-30-88	8-30-88
Time Sampled:	15:45	15:50
Date Extracted:	9-10-88	10-29-88
Date Analyzed:	10-20-88	11-02-88
Percent Moisture:	- 9	8

	Compound D	etection Limits		L RESULTS veight)	
		ug/kg	ug/kg	ug/kg	
	Phenanthrene	330	ND	ND	
	Anthracene	330	ND	ND	
1	Dibutyl phthalate	330	ND	ND	
HI GRANDI	Dibutyl phthalate Fluoranthene 4-Chlorophenyl phenyl ether	330	ND	ND	
- A	4-Chlorophenyl phenyl ether	330	ND	ND	
	Pyrene	330	ND	ND	
STATE OF THE PERSON	Butyl Benzyl phthalate Bis(2-ethylhexyl) phthalate	330	ND	ND	
ET THE STATE OF TH	Bis(2-ethylhexyl) phthalate	330	ND	ND	
	Chrysene	330	ND	ND	
Topic .	4-Bromophenyl phenyl ether	330	ND	ND	
	4-Bromophenyl phenyl ether Benzo(a)anthracene	330	ND	ND	
- ·	Di-n-octylphthalate	330	ND	ND	
£	Benzo(b)fluoranthene Benzo(k)fluoranthene Benzidine	330	ND	ND	
The same	Benzo(k)fluoranthene	330	ND	ND	
Ĩ.	Benzidine	2000	ND	ND	
	3,3'-Dichlorobenzidine	660	ND	ND	
	Benzo(a)pyrene	330	ND	ND	
	Indeno(1,2,3-cd)pyrene	330	ND	ND	
	Dibenzo(a,h)anthracene	330	ND	ND	
	Benzo(ghi)perylene Benzyl Alcohol	330	ND	ND	
A Care	Benzyl Alcohol	660	ND	ND	

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 31, 1988 Date Reported: December 8, 1988

Work Order: 937 Job Number: OR001

For: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.:	88092225 DANGB-2BH2- SS4- 14-15'	88092226 DANGB-2BH2- SS5- 20-22'
Date Sampled:	8-30-88	8-30-88
Time Sampled:	15:45	15:50
Date Extracted:	9-10-88	10-29-88
Date Analyzed:	10-20-88	11-02-88
Percent Moisture:	9	8

Compound	Detection Limits		al Results weight)
	ug/kg	ug/kg	ug/kg
Acetophenone	*	ND	ND
Aniline	*	ND	ND.
4-Aminobiphenyl	x	ND	ND
4-Chloroaniline	660	ND	ND
1-Chloronaphthalene	*	ND	ND
Dibenzofuran	330	ND	ND
p-Dimethylaminoazobenzene	*	ND	ND
7,12-Dimethylbenz(a)anthra	cene*	ND	ND
a-,a-Dimethylphenethylamin	e*	ND	ND
Diphenylamine	*	ND	ND
1,2-Diphenylhydrazine	*	ND	ND
Ethyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	*	ND	ND
Methyl methanesulfonate	~-*	ND	ND
3-Methylnaphthalene	330	ND	ND
1-Naphthylamine	*	ND	ND
2-Naphthylamine	*	ND	ND
2-Nitroaniline	1600	ND	ND
3-Nitroaniline	1600	ND	ND
4-Nitroaniline	1600	ND	ND
N-Nitroso-di-n-butylamine	~-*	ND	ND
N-Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	~ −*	ND	ND
Pentachloronitrobenzene	*	ND	ND
Phenacetin	*	ND	ND
3-Picoline	*	ND	ND
∂ronamide	*	ND	ND
1,2,4,5-Tetrachlorobenzene	·*	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: August 31, 1988 Work Order: 937
Date Reported: December 8, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth 4NGB ATTN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092225	88092226
Sample No.:	DANGB-2BH2-	DANGB-2BH2-
•	SS4- 14-15'	SS5- 20-22'
Date Sampled:	8-30-88	8-30-88
Time Sampled:	15:45	15:50
Date Extracted:	9-10-88	10-29-88
Date Analyzed:	10-20-88	11-02-88
Percent Moisture:	9	8

Compound	Detection Limits	ANALYTICAL RESULTS (dry weight)	
	ug/kg	ug/kg	ug/kg
Alpha-BHC	*	ND	ND
; Gamma-BHC	*	ND	ND
Beta-BHC	660	ND	ND
Heptachlor	330	ND	ND
Delta-BHC	500	ND	ND
Aldrin	330	ND	ND
Heptachlor epoxide	330	ND	ND
Endosulfan I	*	ND	ND
Dieldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
Endrin	*	ND	ND
Endosulfan II	*	ND	ND
4,4'-DDD	500	ND	ND
³ 4,4'-DDT	830	ND	ND
Endosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
Endrin Ketone	*	ND	ND
Chlordane	2000	ND	N D
Methoxychlor	*	ND	N D
Toxaphene	2000	ND	N D
Aroclor-1016	2000	ND	ND
Aroclor-1221	2000	ND	ND
1 Aros 1 or. 1922	2000	ND	ND
Aroclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND .
Aroclor-1254	2000	ND	ND
Aroclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: August 31, 1988 Date Reported: December 8, 1988 Work Order: 937 Job Number: OR001

ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88092225	88092226
Sample No.:	DANGB-2BH2-	DANGB-2BH2-
	SS4- 14-15'	SS5- 20-22!
Date Sampled:	8-30-88	8-30-88
Time Sampled:	15:45	15:50
Date Extracted:	9-10-88	10-29-88
Date Analyzed:	10-20-88	11-02-88
rercent Moisture:	9	8

Compound	Detection · Limits	ANALYTICA (dry w		
	ug/kg	ug/kg	ug/kg	
2-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
Phenol	330	ND	ND	
2,4-Dimethylphenol	330	ND	ND	
2,4-Dichlorophenol	330	ND	ND	
2,4,6-Trichlorophenol	330	ND	ND	
4-Chloro-3-methylphenol	660	ND	ND	
2,4-Dinitrophenol	1600	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
2-Methyl-4,6-Dinitrophenol	1600	ND	ND	
Pentachlorophenol	1600	ND	ND	
4-Nitrophenol	1600	ND	ND	
Benzoic Acid	1600	ND	ND	
2-Methylphenol	330	ND	ND	
3- & 4-Methylphenol	330	ND	ND	
3,3,4,6-Tetrachlorophenol	*	ND	ND	
2,4,5-Trichlorophenol	330	ND	ND	

Laboratory Supervisor

- A EPA has not yet determined detection limits for these compounds.
- B = Compound was detected in the blank.

Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Pate Received: August 31, 1988 Work Order: 937 Date Reported: December 8, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden

FOR: Address: ES Tak Ridge/Duluth ANGB
710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

等		
Lab Number:	88092223	88092224
ှုာ့ခုample No.:	DANGB-2BH1-	DANGB-2BH1-
	SS6- 15-17'	SS7- 22-24'
Date Sampled:	8-30-88	8-30-88
_Time Sampled:	16:40	16:50
pate Extracted:	9-10-88	9-10-88
Luate Analyzed:	10-20-88	10-22-88
Percent Moisture:	8	9

compound	Detection Limits		L RESULTS eight)	
The state of the s	ug/ka	ug/kg	ug/kg	_
1,3-Dichlorobenzene	330	ND	ND	
1,4-Dichlorobenzene	330	ND	ND	
jexachloroethane	330	ND	ND	
lis(2-chloroethyl)ether	330	ND	ND	
1,2-Dichlorobenzene	330 .	ND	ND	
#-Nitrosodimethylamine	330	ND	ND	
sis(2-chloroisopropyl)ethe	r 330	ND	ND	
N-Nitrosodi-n-propylamine	330	ND	ND	
	330	ND	ND	
\$,2,4-Trichlorobenzene	330	ND	ND	
¹ Nitrobenzene	330	ND	ND	
Isophorone	330	ND	ND	
	330	ND	ND	
15is(2-chloroethoxy)methane	330	ND	ND	
2-Chloronaphthalene	330	ND	ND	
<pre> iexachlorocyclopentadiene</pre>	330	ND	ND	
\$cenaphthylene	330	ND	ND	
Acenaphthene	330	ND	ND	
*Dimethyl phthalate	330	ND	ND	
,6-Dinitrotoluene Fluorene	330	ND	ND	
	330	ND	ND	
2,4-Dinitrotoluene	330	ND	ND	
piethyl phthalate	330	ND	ND	
-Nitrosodiphenylamine	330	ND	ND	
Hexachlorobenzene	330	ND	ND	

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received:

August 31, 1988

Work Order: 937

ate Reported:

December 8, 1988

Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830.

ab Number: ample No.:	88092223 DANGB-2BH1- SS6- 15-17'	88092224 DANGB-2BH1- SS7- 22-24'
ate Sampled:	8-30-88	8-30-88
ime Sampled:	16:40	16:50
ate Extracted:	9-10-88	9-10-88
ate Analyzed:	10-20-88	10-22-88
ercent Moisture:	8	9

ompound I	Detection Limits		L RESULTS reight)
	ug/kg	ug/kg	ug/kg
nenanthrene	330	ND	ND
nthracene	330	ND	ND
ibutyl phthalate	330	ND	ND
luoranthene	330	ND	ND
-Chlorophenyl phenyl ether	330	ND	ND
yrene	330	ND	ND
utyl Benzyl phthalate	330	ND	ND
is(2-ethylhexyl) phthalate	∍ 330	ND	ND
irysene	330	ND	ND
-Bromophenyl phenyl ether	330	ND	ND
enzo(a)anthracene	330	ND	ND
i-n-octylphthalate	330	ND	ND
enzo(b)fluoranthene	330	ND	ND
enzo(k)fluoranthene	330	ND	ND
enzidine	2000	ND	ND
,3'-Dichlorobenzidine	660	ND	ND
∍nzo(a)pyrene	330	ND	ND
ndeno(1,2,3-cd)pyrene	330	ND	ND
ibenzo(a,h)anthracene	330	ND	ND
enzo(ghi)perylene	330	ND	ND
enzyl Alcohol	660	ND	ND

Priority Pollutant Analysis Page 3 of 5 Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: August 31, 1988 Date Reported: December 8, 1988 Work Order: 937 Job Number: OR001

or: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: 88092223 DANGB-2BH1-SS6- 15-17' 8-30-88 88092224 DANGB-2BH1-SS7- 22-24' 8-30-88 Sample No.: pate Sampled: 16:40 9-10-88 Time Sampled: 16:50 Date Extracted: 9-10-68 10-22-88 Date Analyzed: 10-20-88 [‡]Percent Moisture:

Compound	Detection Limits	_	al Results weight)
	ug/kg	ug/kg	ug/kg
	· ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		
cetophenone	*	ND	ND
Aniline	*	ND	ND
4-Aminobiphenyl	*	ND	ND
1-Chloroaniline	660	ND	ND
-Chloronaphthalene	 *	ND	ND
Dibenzofuran	330	ND	ND
p-Dimethylaminoazobenzene		ND	ND
🧜,12-Dimethylbenz(a)anthr		ND	ND
a-,a-Dimethylphenethylami	.ne*	ND	ND
<pre> piphenylamine</pre>	~~*	ND	ND
1.,2-Diphenylhydrazine	*	ND	ND
*Ethyl methanesulfonate	 ★	ND	ND
_3-Methylcholanthrene	*	N D	ND
Methyl methanesulfonate	~~ ★	ND	ND
12-Methylnaphthalene	330	ND	ND
1-Naphthylamine	*	ND	ND
-Naphthylamine	*	ND	ND
2-Nitroaniline	1600	ND	ND
3-Nitroaniline	1600	ND	ND
<pre>#4-Nitroaniline</pre>	1600	ND	ND
N-Nitroso-di-n-butylamine	?	ND	ND
N-Nitrosopiperidine	*** *** *	ND	ND
Pentachlorobenzene	*	ND	ND
Pentachloronitrobenzene	 ★	ND	ND
Phenacetin	*	ND	ND
2-Picoline	*	ND	ND
Pronamide	*	ND	ND
1,2,4,5-Tetrachlorobenzer	1e∗	ND	ND

EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

ate Received: August 31, 1988 Work Order: 937 ate Reported: December 8, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number: ample No.:	88092223 DANGB-2BH1- S56- 15-17'	88092224 DANGB-2BH1- SS7- 22-24'
ate Sampled:	8-30-88	8-30-88
ime Sampled:	16:40	16:50
ate Extracted:	9-10-88	9-10-88
ate Analyzed:	10-20-88	10-22-88
ercent Maisture:	8	9

ompound	Detection Limits	ANA	ALYTICAL RESULTS (dry weight)
	ug/kg	ug/kg	ug/kg
lpha-BHC	*	ND	ND
amma-BHC	*	ND	ND
eta-BHC	660	ND	ND
eptachlor	330	ND	ND
elta-BHC	500	ND	ND
ldrin	330	ND	ND .
eptachlor epoxide	330	ND	ND
adosulfan I	*	ND	ND
ıeldrin	500	ND	ND
,4'-DDE	1000	ND	ND
adrin	*	ND	ND
ndosulfan II	*	ND	ND
,4'-DDD	500	ND	ND
,4'-DDT	830	ND	ND
ndosulfan Sulfate	1000	ND	ND
ndrin aldehyde	*	ND	ND
ndrin Ketone	*	ND	ND
alordane	2000	ND	ND
<pre>⇒thoxychlor</pre>	*	ND	ND
oxaphene	2000	ND	ND
roclor-1016	2000	ND	ND
roclor-1221	2000	ND	ND
roclor-1232	2000	ND	ND
roclor-1242	2000	ND	ND
roclor-1248	2000	ND	ND
roclor-1254	2000	ND	ND
roclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds. 2034

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Tate Received: August 31, 1988 ate Reported: December 8, 1988 Work Order: 937 Job Number: OR001

ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

iddress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

1.			
I. Lab Number:	88092223	88092224	
Sample No.:	DANGB-2BH1-	DANGB-2BH1-	
Series	SS6- 15-17'	SS7- 22-24'	
Sample No.: Sample No.: Sampled:	8-30-88	8-30-88	
Time Sampled:	16:40	16:50	
Date Extracted: []]]]]]]]]]]]]]]]]]	9-10-88	9-10-88	
ate Analyzed:	10-20-88	10-22-88	
Percent Moisture:	8	9	

Compound	Detection Limits	ANALYTICAL RESULTS (dry weight)		
-	ug/kg	ug/kg	ug/kg	
2-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
^r henol	330	ND	ND	
2,4~Dimethylphenol	330	ND	ND	
2,4-Dichlorophenol	330	ND	ND	
2,4,6-Trichlorophenol	330	ND	ND	
!-Chloro-3-methylphenol	660	ND	ND	
12,4-Dinitrophenol	1600	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
<pre>1-Methyl-4,6-Dinitrophenol</pre>	1600	ND	ND	
entachlorophenol	1600	ND	ND	
4-Nitrophenol	1600	ND	ND	
¿Benzoic Acid	1600	ND	ND	
2-Methylphenol	330	ND	ND	
³3- & 4-Methylphenol	330	ND	ND	
2,3,4,6-Tetrachlorophenol	*	ND	ND	
2,4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ATTLE CONTINUING CALIBRATION CHECK

√ame ε			Contract:	
Code:	Case No.:	SAS	No.:	
trument	ID:_carbopak	Calibrati	on Date(s):_9/9/8%	, ,
\D E1!E	ID. 30 33	Tail Cali	D-+-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	9/2/8

1POUND	RRF	RRF50	% D
mayl chloride	0.08		100.00
s (2-charaethoxy)			
thanes (2-chore.sopropy)	0.04		100.00
16h	0.26		100.00
ວພດກົບພະຍາຄ	1.17	1.05	9.96
modichlr omethane	4.54	3.64	19.79
omofc.~r	3.48	2.92	15.85
momethane	0.38	0.16	59.02
bon termachionide	4.58	4.07	11.05
ondacetel Mehyde	ERR	• •	ERR
.orobecasta	1.48	1.43	3.42
or oethers	0.58	0.51	12.49
_orofora	4.87	3.83	21.80
Donohexans	1.02	. 0.94	8.50
Chlorostoki vrzył ethen_	0.04		100.00
Cr-Opertham	0.49	0.18	3.31
corometty; methyl ether_	0.37		100.00
m_រុង ក្_បិកវែលកូចថា eenes	4.06	3.84	5.50
momorble compliane	5.29	3.82	27.84
n pmome? Letre	3.56	2.27	36.17
2_Dich har some never	2.70	7.65	2.76
3_Dichieral homens	2.42	2.23	7.90
4_Dich) or observens	2.36	2.20	7.02
th)orpoof.wormethene	0.54		100.00
1_DichloroerHane	2.58	2.01	22.05
1_Dichlorostmane	3.23	2.67	17.10
1_Dichloroethylene	2.79	2.23	20.06
-ns_1,2_d:chloroethylene	2.79	2.28	23.89
thloromethane	3.07	2.92	4.83
1_Dichloropropane	2.67	2.22	16.72
"_Dich open opylene	5.98	4.81	19.49
1,2,2_Tetrochloroethane_	9.09	8.89	2.25
1,1,2_Tetrachloroethane_	4.51	4.27	5.25
rachloroethylene	9.10	8.89	2.26
,1 Trich crosthane	3.43	- 2.79	18.68
1,2 Thirth orcethero	5.98	4.81	19.57
colorects and	4.32	3.90	9.92
Secretary of the transfer of the second	2.76	1.98	28.25
THE PROPERTY AND THE PARTY OF T	3.33	2.90	12.98
Type Control of the second	1.43	0.58	59.78
		i	

ATILE CONTINUING CALIBR	ATION CH	IECK		
bName: ENGINEERING SCIENCE	And Parks and Waynes and	Contr	act:	
Code: Case No.:_	SAS	No.:	sdg	No.:
Strument ID.:carbopak Cal	ibration D	ate(s):_	9/ 9 /88	
B FILE ID: RRF 5032			Int	cal = 9/2/88
				all a communication deligible and a second s
OMPOUND	RRF	RRF50	%D	
Unzene	5.93	4.74	-20.08	
hlorobenzene		4.91	0.27	
[12_Dichlorobenzene	3.97	3.78	-4.72	
[2_Dichlorobenzene	4.57	4.52	-1.06	
,4_Dichorobenmene	3.83	3.43		•
[thyl Benzene		3.74		
ibluene	3.79	3.70		
1/21 en ac	17 14		_0 70	

The second of th

Antidian Managarah

deliashinkishinda Locales d

The second parameter and

Francisco Resist

Statement State of

Enterpresentations

ATTUE ORGANIES INITIAL CALIBRATION DATA

Name!		*	Contr	ă¢t:			
Coda: Case No.:	The same of the same of the	SAS	No::	- ,	SDG N	lo. i 🚣	
trument ID.:earbopak Ga	îl îbrat	ion D	àtē(š):	_911/88	3	910/8	J
AB FILE ID:	RRF1)= 65 . 5	53	RRF20)=66	,54	
AB FILE ID: RF 50=67,50	RRF1	oe≣68,5	55	_ ŘŘĚŽO	00=69,56	·	
MPOUND	RRF10	ŔŔĒ20	RŘĖŠO	ŔRF100	RRF200	RRF	%RSD
nzyl chloride	0.08	0.04	0.05 7	0,10	0.08	0.08	29.24
ē (Ž÷čbárčèthãx∨)				••.			
methane	_ 0.03	0.03	0.05	0.04	0.06	0.04	31.04
methane s (2-cheroisopropy)	_	ř	•	,			
ëther	0.24	0.27	0.26	. 0.24			9.50
omobéháéne	0.44	0.68	1.03	1.22	1.32	0.94	39.54
omodichloromethane	3.79	5.48	3.61	4.00	3.63	3.70	5.42
ōmoferm		1.96	2.54	4.00 3.19	2.99	2.59	19.57
omomethène	0.28	0.31		0.44		0.38	22.24
rbon tetrachloride	4.25	4.11	4,03	4.41	3.97	4.15	.,4.27
loroacetaldehyde		0.002	0.001	0.0005	0.000	3 ERR	ol 4.27 Sex 6
lerobenzehe		1.18	1.31	1.49	1.36		8.60
) or oethane	0.57	0.54		0.63	0.64	0.58	8.24
loroform	4.93	4.13		4.41			9.34
Chorohexano		0.78		1.01	1.07		21.17
Chloroet y/ Vinyl ether	0.03	0.03		0.04			31.04
loromethanc		0.43		0.45	0.51		13.01
loromethyl methyl ether	0.10	0.21		0.16	0.15		24.46
,m_,& p_Chlorotoluenes		3.66		4.07		3.83	8.12
promochloromethane				4.37			5.24
promomethane							24.09
2_Dichlorobenzene	2.95						8.49
3_Dichlorobensene				2.37			7.34
4_Dichlorobenzene		2.02		2.12	1.94		7.82
chlorod: fluormethane				0.57			11.63
1_Dichloroethane	7. AS	1.55		2.51			19.09
2_Dichloroethane	3 25	2.55					
1_Dichloroethylene	3 11	2.14					14.04
ans_1,2_dichloroethylene				2.75			15.38
				1.75			16.07
chloromethane	 	2.32		2.64	,		
2_Dichloroprôpane 3_Dichloropropylene	_ # () 	A 🗦 🛪	4.91	4.99			
1,2,2_Teffachloroethane			7.17	7.99			
				4.20			
1,1,2_Tetrachloroethane,			4.50 7.17	7.99			
trachloroethylene				7.99 3.20			
1,1_Trichloreethane							
1,2_Tricilurbethana	_ +.V.) E 600	4.73	4.71 4.39	4.99 4.66	4.88 3.90		8.30 15.77
ichiorum nyiene	i olom Ber	ಗ.ವನ ಶಹನ		2.77			
idulor:4/usemethānē				_			
16hlores endre				3.00			
nyl thior in	1 . 41	1.59	1.4j	1.39	1.40	1.43	6.11

Name: ENGINEERING SCI	AL CALIE	BRATION	DĂTĂ Căntr	act:	····		
Côde: Case No Strument ID.::carbopak							
AB FILE ID: RRF 10 RF 50=67	65		RRF 20	6	5		
ÎMPOUND	RRF10	RRÉ20	RRF50	ŘRF100	RRF200	RRF	%RSD
Tanzene lenobenzene ,2_Dichlorobenzene 3_Dichlorobenzene 4_Dichlorobenzene chyl Benzene bluene lenes	_ 7.66 _ 3.63 _ 3.51 _ 6.70 _ 4.79	5.59 8.30 4.31 5.27 3.67	4.98 10.85 4.91 3.77 3.57	4.66 7.09 4.02 3.48 3.83	5.82 4.90 3.64	4.65 5.49 7.18 4.33 4.57 3.88	6.63 23.33 36.73 13.92 30.43

Company of the second s

plantinimaministi (4 - pr - pr /

becommunicated of

Alemante and the second

Permittendenting

Management of

White Mileson

Symptochical Levenboltone

Alterdiscontinuity

This page intentionally left blank,

DATA PACKAGE #33

This page intentionally left blank.

Job No.:

The second state of the second

ORO01

Client: Attention:

ES Oak Ridge Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

37830

Project:

Duluth ANGB

Attached are the analytical reports for the water samples received by this laboratory on 9-12-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092321	DANGB-4-MW21-GW1	BA-I	9-10-88	····	10-18-88	······································
88092321	DANGB-4-MW21-GW1	CD-F	9-10-88		10-24-88	
88092321	DANGB-4-MW21-GW1	CR-F	9-10-88		11-01-88	
88092321	DANGB-4-MW21-GW1	PB-F	9-10-88		10-20-88	
88092321	DANGB-4-MW21-GW1	418.1	9-10-88	9-29-88	10-05-88	
880 9 2321	DANGB-4-MW21-GW1	8010	9-10-88		9-16-88	9-15-88
88092321	DANGB-4-MW21-GW1	8020	9-10-88		9-16-88	9-15-88
88092322	DANGB-4-MW24-GW1	BA-I	9-10-88		10-18-88	
88092322	DANGB-4-MW24-GW1	CD-F	9-10-88		10-24-88	
88092322	DANGB-4-MW24-GW1	CR-F	9-10-88		11-01-88	
88092322	DANGB-4-MW24-GW1	PB-F	9-10-88		10-20-88	
88092322	DANGB-4-MW24-GW1	418.1	9-10-88	9-29-88	10-05-88	
88092322	DANGB-4-MW24-GW1	8010	9-10-88		9-16-88	9-15-88
88092322	DANGB-4-:11/124-GW1	802 0	9-10-88		9-16-88	9-15-88
88092323	DANGB-8-GW8B-GW1	BA-I	9-10-88		10-18-88	
88092323	DANGB-8-GW8B-GW1	CD-F	9-10-88		10-24-88	
88092323	DANGB-8-GW8B-GW1	CR-F	9-10-88		11-01-88	
88092323	DANGB-8-GW8B-GW1	PB-F	9-10-88		10-20-88	
88092323	DANGB-8-GW8B-GW1	418.1	9-10-88	9-29-88	10-05-88	
88092323	DANGB-8-GV8B-GW1	8010	9-10-88		9-20-38	9-15-88
88092323	DANGB-8-GW8B-GW1	8020	9-10-88		9-20-88	9-15-88
88092323	DANGB-8-GW8B-GW1	8080	9-10-88	9-15-88	10-16-88	

^{*} If applicable

THE PERSONAL PROPERTY OF THE P



P. III THE REPORT OF THE PROPERTY OF THE PROPE

Job No.:

ORO01

Project:

Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092324	DANGB-BR3	BA-I	9-10-88		10-18-88	
88092324	DANGB-BR3	CD-F	9-10-88		10-24-88	
88092324	DANGB-BR3	CR-F	9-10-88		11-01-88	
88092324	DANGB-BR3	PB-F	9-10-88		10-20-88	
88092324	DANGB-BR3	418.1	9-10-88	9-29-88	10-05-88	
88092324	DANGB-BR3	8010	9-10-88		9-20-88	9-15-88
88092324	DAN-7B-BR3	8020	9-10 - 88		9-20-88	
88092324	DANGB-BR3	8080	9-10-88	9-15-88	10-16-88	10-19-88
88092325	DANGB-4-MW22-GW1	BA-I	9-10-88		10-18-88	
88092325	DANCB-4-MW22-GW1	CD-F	9-10-88		10-24-88	
88092325	DANGB-4-MW22-GW1	CR-F	9-10-88		11-01-88	
88092325	DANGB-4-MW22-GW1	PB-F	9-10-88		10-20-88	
38092325	DANGB-4-MW22-GW1	418.1	9-10-88	9-29-88	10 - 05-88	
88 092325	DANGB-4-MW22-GW1	8010	9-10-88		9-20-88	9-15-88
38092325	DANGB-4-11/1/22-GW1	8020	9-10 - 88		9-20-88	
88092327	DANGB-8-GVSA-GV1	BA-I	9-10-88		10-18-88	
88092327	DANGB-8-GW8A-GW1	CD-F	9-10-88	,	10-24-88	
88092327	DANGB-8-GW8A-GW1	CR-F	9-10-88		11-01-88	
88092327	DANGB-8-GW8A-GW1	PB-F	9-10-88		10-20-88	
88092327	DANGB-8-GW8A-GW1	418.1	9-10-88	9-29-88	10-05-88	
88092327	DANGB-8-GW8A-GW1	8010	9-10-88		9-20-88	9-15-88
88092327	DANGB-8-GW8A-GW1	8020	9-10-88		9-20-88	
88092327	DANGB-8-GW8A-GW1	8080	9-10-88	9-15-88	10-16-88	10-19-88

^{*} If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S):: 88092321-88092325, 88092327
WORK ORDER NO.: 962

These water samples were received at the ES Berkeley Laboratory on 9-12-88. They were received cold and intact.

2045

CHAIN OF CUSTUDY RECORD

;

			000.00	
ES.JOB NO.	PROJECT HAME/LOCATION		WATER ANALYSES	YSES
OR001	Duluth ANGB/Duluth, Mn.	ν O	(5)	ENGINEERING-BORNCE LABORATORY, INC.
SAMPLEM B): (Bignatura	algnatura)	CON-		910
DATE TIME	SAMPLE DESCRIPTION	TAIMERS		REMARKS
0510 YS-01-6	DANCIS- BRZ	Ŋ		3,50,30,4
9-10-51 0900	DANGS-FB	7.	><	882328
5160 45-01-6	DANGB-4-MW22CW-1	5	×	882325
9-16-5× 1015	DANGG-4- MWZI- CW-1 -	5	×	Wallet 323 323 882331
4-10-88 1120	DANGB-4- AW24-6W-1	S	\ \ \	288333
0151 131D	DANGG-8-GW8B-CW-1	5	×	882323
0151 9511.6	DANUB-8-6WGA-6W-1	S	R	882327
1-7-58 0436	9	W	×	888339
	Z XI			
2				
04				
6				
Relinquished by: (Signature)	Colonature) Date/Time Received by: (Signature)	iture)	Relinquished by: (Signature)	Date/Time Received by: (Signature)
telinquished by: (Signature)	Date/Time Received in (Signature)	tuoli Buile	09/12 930 5321/2/e	somerne Somples recited coldonelintect
Dietribu	Distribution: Original Accompanies Shipment, Copy to Cool	Coordinator Fleid Files	leid Files	

The Mark the Mark the Control

DHAF

PACINEERING-BOILNCE

72%

WANTED STATES

CHAIN OF CUSTODY RECORD

ES JOB NO.	NO.	PROJECT NAME/LOCATION		WATER ANALYSES	
OR001	01	Dulath ANGB/Duluth, Mn.	0 Z	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	LABONATORY, INC.
SAMPLE	ER S): (SIgnetu	SAISPLEM 8): (Signeture)	CON-	674	600 Bancroft Way Berkeley, CA 94710
DATE	T M	SAMPLE DESCRIPTION	TAINERS		NEMARKS
9-10-53	1015	DANGB-4- MWZ/-6W-1	4	X X X	×82321
9-11-6	9.10-58 1120	DANG B-4	4	X X X X X X X X X X	11883828 1883333
9-10-57	1310	DANGB-8-6W4B-6W-1	4	メメメ	382333
		1, 12/1/			
2					
04					
17					
Pally, qui	Thed, by	Malingulahed, by: (Signature) Date/Time Received by: (Signature) (170) Fed Ex A15 A14 25 (170) 9490 314 256	·供。	Relinquished by: (Signature)	Date/Time Received by: (Signature)
Ne lin qui	shed by	Relinquished by: (Signature) Date/Ilme Received for Laborat	The provided	DeterTime Remarks (521/20)	Samples received cold cold in tect.

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

ENGINERRING-SCIENCE

CHAIN OF CUSTUDY RECORD

462

•				_		A	
OR001	OR001	Duluth ANGB/ Duluth, Mn.	N O V	1	WAIER A	YSES	/ SHIP TO:
SAMPL	SAMPLEM B): (Signatur	Høngturøl	0 G	021	194 (c).	S PI	LABORATORY, INC. 600 Baneroft Way Berkeley, CA 84710
DATE	1110	SAMPLE DESCRIPTION	TAINERS	02000		200	
88-11-6	0730	DANGE-BR3	4	< I = '	e S	(स्टबरक्त	10.51 x11, vc
1-10-58	9-10-58 0915	DAN GB-4-MWZ 2-6W-1	-4		٤ 5	.	メリカシブ 自分がある
		A V					
		· · · · · · · · · · · · · · · · · · ·					
	1						
2							
340							
3							
Illnqui	Relinquished by:	(Signature) Date/Time Received by: (Signature) (440 3/108)	, L	Relinquished b	by: (Signature)	Date/Time	Received by: (Signature)
Jabulla	shed by:	Malinquished by: (Signature) Date/Time Received for Laboratory by:	lory by:	Dete/Time	Remard 50 to	ples received with and	co'd and inted
			- 1/2	10000	•		,

DnAF.

E. JC., JE., JC. SOIE, CE

962

CHAIN OF CUSTODY RECORD

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

ENGLYTERING-SCIENCE INC. 11/21/88

PAGE 1

ANALYSIS REPORT

: ZB0000000440

ORCE DATE : 09/12/88

EPORT DATA:

3 OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. \$103

AK RIDGE, TN 37830

ILL NAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

Lab Supervisor

710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : 30R001

CHACT

: BILL NAYDEN

(615)-481-3920

ASK: 2, UNITS: mg/L

EST COMPOUND	DANGB-4-MW21- GW-1 88092321	DANGB-4-MW24- GW-1 88092322	DANGB-E-GW8B- GW-1 88092323	DANGB-BR3 88092324	DANGB-4-MW22- GW-1 88092325	DANGB-8-GW8A- GW-1 88092327
CID DIG FLAME	NA	NA	NA	NA	NA	NA
CID DIG FURNACE	NA	NA	NA	NA	NA	NA
ARIUM	0.06BN	<0.05N	0.058N	0.05BN	0.11BN	0.01BN
ADMIUM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
HRONIUM	<0.002	0.0024 B	<0.002	<0.002	0.0029R	<0.002
EAD	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

^{: -} Not Detected

⁻ Not Applicable

ENGINEERING-SCIENCE INC. 11/21/88

PAGE 2

ANALYSIS REPORT

FORK ORDER P'MBER: 962

JOB NUMBER WORK ORDER DATE : 09/12/88

: ZB0000000440

Lab Supervisor

EPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

CLIENT DATA:

APPROVED BY

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

BILL HAYDEN # OF REPORT COPIES: 1

::ONTRACT / PO # : 30R001

: BILL HAYDEN

(615)-481-3920

'ASK: 3, UNITS: mg/L

EST COMPOUND	DANGB-4-MW21- GW-1 88092321	DANGB-4-MW24- GW-1 88092322	DANGB-8-GW8B- GW-1 88092323	DANGB-BR3 88092324	DANGB-4-MW22- GW-1 88092325	DANGB-8-GW8A- GW-1 88092327
2 418.1 PETROLEUM HYDROCARBONS	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5

ND - Not Detected

ENGINEERING-SCIENCE INC. 11/21/88

ANALYSIS REPORT

ORK ORDER NUMBER: 962

: ZB0000000440 OB NUMBER

APPROVED BY

ORK ORDER DATE : 09/12/88

Lab Supervisor

EPORT DATA:

CLIENT DATA:

S OAK RIDGE/DULUTH ANGB 10 S. ILLINOIS AVE. STE. S103 ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

AK RIDGE, TN 37830

OAK RIDGE, TN 37830

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : 30R001

: BILL HAYDEN

ONTACT

(615)-481-3920

ASK: 4, UNITS: Ug/L, GROUP 8010

	DANGB-4-MW21-	DANGB-4-MW24-	DANGB-8-GW8B-	DANGB-BR3	DANGB-4-MW22-	DANGB-8-GW8A-
	GW-1	GW-1	GW-1		GW-1	GW-1
EST COMPOUND	88092321	88092322	88092323	88092324	88092325	88092327
ENZYL CHLORIDE	ND	ND	ND	ND	ND	ND
:S (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND	ND
:S (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND	ND
ROMOBENZENE	ND	ND	ND	ND	ND	ND
ROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND
ROMOFORM	ND	ND	ND	ND	ND	ND
ROMOETHANE	ND	ND	ND	ND	ND	ND
ARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
HLORACETALDEHYDE	ND	ND	ND	ND	ND	ND
∤LORAL	ND	ND	ND	ND	ND	ND
ILOROBENZENE	ND	ND	ND	ND	ND	ND
ILOROETHANE	ND	ND	ND	ND	ND	ND
	ND	0.18	ND	0.59B	0.23B	ND
-CHLOROHEXANE	ND	ND	ND	ND	ND	ND
-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
HLOROMETHANE	ND	ND	ND	ND	ND	ND
ILOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND	ND
ILOROTOLUENE	ND	ND	ND	ND	ND	ND
. BROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
:BROMOMETHANE	ND	ND	ND	ND	ND	ND
, 2-D1CHLOROBENZENE	ND	ND	ND	ND	ND	ND
,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
,4-D1CHLOROBENZENE	ND	ND	ND	ND	ND	ND
:CHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND	ND
1-DICHLOROETHANE	ND	ND	ND	NO	ND	ND
2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
1-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
ANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	2.6B	4.1B	0.468	1.78	0.698	1.6B
2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND

> - Not Detected

PAGE 4

ENGINEERING-SCIENCE INC. 11/21/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 962

	DANGB-4-MW21- GW-1	DANGB-4-MW24- GW-1	DANGB-8-GW8B- GW-1	DANGB-BR3	DANGB-4-MW22- GW-1	DANGB-8-GW8A- GW-1
TEST COMPOUND	88092321	88092322	88092323	88092324	88092325	88092327
E de la companya de l		• ••••••			• ••••••	
1,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
g-1,1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
FETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND
्रैं 1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
* TRICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
IRICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND	ND
TRICHLOROPROPANE	ND	ND	ND	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND

ND - Not Detected

gerear at company

ENGINEERING-SCIENCE INC. 11/21/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 96

ASK: 4, UNITS: ug/L, GROUP 8010

	DANGB-FB6	DANGB-TB3
EST COMPOUND	88092328	88092329
ENZYL CHLORIDE	ND	ND
IS (2-CHLOROETHOXY)METHANE	ND	ND
IS (3-CHLOROISOPROPYL)ETHER	ND	ND
ROMOBENZENE	ND	ND
ROMODICHLOROMETHANE	ND	ND
ROMOFORM	ND	ND
ROMOETHANE	ND	ND
ARBON TETRACHLORIDE	ND	ND
HLORACETALDEHYDE	ND	ND
HLORAL	ND	ND
HLOROBENZENE	ND	ND
HLOROETHANE	ND	ND
HLOROFORM	16	ND
-CHLOROHEXANE	ND	ND
-CHLOROETHYL VINYL ETHER	ND	ND
HLOROMETHANE	ND	ND
HLOROMETHYL METHYL ETHER	ND	ND
HLOROTOLUENE	ND	ND
IBROMOCHLOROMETHANE	ND	ND
IBROMOMETHANE	ND	ND
,2-DICHLOROBENZENE	ND	ND
,3-D1CHLOROBENZENE	ND	ND
,4-DICHLOROBENZENE	ND	ND
ICHLOROD I FLUOROMETHANE	ND	ND
,1-DICHLOROETHANE	ND	D
,2-DICHLOROETHANE	ND	ND
,1-DICHLOROETHYLENE	ND	ND
RANS-1,2-DICHLOROETHYLENE	ND	ND
ICHLOROMETHANE	1.48	1.48
,2-DICHLOROPROPANE	ND	ND
,3-D1CHLOROPROPYLENE	ND	ND
,1,2,2-TETRACHLOROETHANE	ND	ND
,1,1,2-TETRACHLOROETHANE	ND	ND
ETRACHLOROETHYLENE	ND	ND
,1,1-TRICHLOROETHANE	ND	ND
,1,2-TRICHLOROETHANE	ND	ND
RICHLOROETHYLENE	ND	ND
RICHLOROFLUOROMETHANE	ND	ND
RICHLOROPROPANE	ND	ND
INYL CHLORIDE	ND	ND

^{) -} Not Detected

ANALYSIS REPORT

WORK ORDER NUMBER:

962

JOB NUMBER : 28000000440

APPROVED BY WORK ORDER DATE : 09/12/88

Lab Supervisor

REPORT DATA: ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830 BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : 30R001

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: ug/L, GROUP 8020

L-habitative, mr. 1	TEST COMPOUND	DANGB-4-MW21- GW-1 88092321	DANGB-4-MW24- GW-1 88092322	DANGB-8-GW8B- GW-1 88092323	DANGB-BR3 88092324	DANGB-4-MW22- GW-1 88092325	DANGB-8-GW8A- GW-1 88092327
Ŧ	BENZENE	22	ND	ND	ND	ND	ND
History	CH!.OROBENZENE	ND	ND	ND	ND	ND	ND
#	-1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
	1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
7	1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
W. 100.	ETHYL BENZENE	ND	ND	ND	ND	ND	ND
ž	TOLUENE	ND	ND	ND	ND	ND	ND
į	XYLENES	ND	ND	ND	ND	ND	ND

ND - Not Detected

ANALYSIS REPORT FOR WORK ORDER NUMBER 96

ASK: 4, UNITS: ug/L, GROUP 8020

	DANGB-F86	DANGB-TB3
EST COMPOUND	88092328	88092329
ENZENE	ND	10
HLOROBENZENE	ND	ND
, 2-DICHLOROBENZENE	ND	ND
,5-DICHLOROBENZENE	ND	ND
,4-D1CHLOROBENZENE	ND	ND
THYL BENZENE	ND	ND
OLUENE	ND	ND
YLENES	ND	ND

ANALYSIS REPORT

FORK ORDER NUMBER: 962

3 JOB NUMBER : 280000000440 WORK ORDER DATE : 09/12/88

APPROVED BY

Lab Supervisor

REPORT DATA:

🖺 🚉 OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : 30R001

CONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/L, GROUP 8080

** the respective	'EST COMPOUND	DANGB-8-GW8B- GW-1 88092323	DANGB-BR3 88092324	DANGB-8-GW8A- GW-1 88092327
₹	\LDRIN	ND	ND	ND
1.54	ALDRIN ALPHA-BHC	ND	ND	ND
	SETA-BHC	ND	ND	ND
	DELTA-BHC	ND	ND	ND
1	SAMMA-BHC	ND	ND	ND
-	CHLORDANE	ND	ND	ND
	4,41-DDD	ND	ND	ND
	4,41-DDE	ND	ND	ND
2	,,4*-DDT	ND	ND	ND
	HELDRIN	ND	ND	ND
	ENDOSULFAN I	ND	ND	ND
	FNDOSULFAN II	ND	ND	ND
1	NDOSULFAN SULFATE	ND	ND	ND
į	LNDRIN	ND	ND	ND
	ENDRIN ALDEHYDE	NA	NA	NA
5	EPTACHLOR	ND	ND	ND
	EPTACHLOR EPOXIDE	ND	ND	ND
1	KEPONE	ND	ND	ND
	METHOXYCHLOR	ND	ND	ND
No.	OXAPHENE	ND	ND	ND
Service .	°CB-1016	ND	ND	ND
	PCB-1221	ND	ND	ND
r	PCB-1232	ND	ND	ND
No.	PCB-1232 'CB-1242	ND	ND	ND
	. CB-1248	ND	ND	ND
	PCB-1254	ND	ND	ND
Manney 4	CB-1260	ND	ND	ND

ND - Not Detected

¶NA - Not Analyzed

Cirganage Circles

"Cliptorolliga who "s

QUALITY CONTROL RESULTS SUMMARY METALS

- The Control of the

QC Report Not 10P-15-0051-88	2 2		Part Reported: 11-07-88	Diluiton Factor: UA
OR001	ES Oak Ridge	Bill Hayden	710 S. Illinois Avenue	Sufte F-103 Oak Ridge, Tn. 37830
Job No.:	Client:	At tn:	Address:	

QC Report for Laboratory Sample No(s): 88092291-88092293, 88092256, 88092303-88092306 88092312-88092317, 88092321-88092327

Duluch ANGB

Project:

Laboratory Supervisor Approval:

		. i	
***************************************	1		
	2	<u> </u>	N69
	Spike Recovery	A66	1.38
	Spike 1		2.0 <0.05 1.38 69N
	* 0	We 0.15 75	2.0
		44.5	NC
	Dapt Feate		<0.0>
			<0.2 <0.n5 <0.05
	Blank		<0.2
	Anal	no cuoa	60109
	Da t.e	rrep	10-17-88 10-14-88
	Date	Amai	10-17-88
	Sample Nos.	Sp1ke	88092291
	Laboratory Sample Nos.	Duplicates	88092291
	Analyte		Bartum

2058

N - See Legend attached.

100 Cl = Concentration One C2 = Concentration Two	SSR = Spiked Sample Resul
Relative Percent Difference (RPD) = $\frac{C1 - C2}{(C1 + C2)/2}$ X 100	Percent Recovery (PR) = SSR - SR x 100

SA

NA = Not Applicable NC = Not Calculated NB = Not Detected

;

QUALİTY CONTROL RESULTS SUHHARY METALS

The state of the s

T

COSARCON

CHARLES CONTROL OF THE PARTY OF

ipodestronomics

Con and a

husgennedated

And shirt from the same of the

And andered to

September 1

E-dandstable \$

CANADA VA

Click: ES Oak Ridge	Job No.:	: OROO1						30	OC Report By:		AA F	AAF-U-0032-8"	-3:4		
Mail Hayden	Client:	ES O	ak Ridge					e de	aple Hati	 X	Uar.	in r			
## Suite F-103 Suite F-104 Su	Attn:	BIII	Hayden					17-1	in Beceli	: [) -L	18-18			
Suite F-103 Oak Ridge, Th. 37830 Diffurion factor: ItA	Address:		S. Illinois A	venue				144	in Roport	. r.d.:	4-1	17-88			
Project		Suft Oak	e F-103 Ridge, In.	37830				2	Incion E	ictor:	¥				
QC Report for Laboratory Sample No(s): R8092256, 88092306, 88092306, 88092291-88092293 R8092256, 880923056, 88092306, 88092291-88092293 R8092256, 88092366, 88092306, 880922301-88092307 R8092256, 88092256, 88092256 R8092256, 88092256 RR Covery Namble Nos. Recovery Namble Nos. Recovery Nethod Recovery Namble Nos.	Project:		th ANGB					,						1	
Laboratory Sample Nos. Date Date Anal Anal First Anal epor</th> <th>t for Labora 8809 8809</th> <th>tory Sample 1 2256, 8809230 2312-88092316</th> <th>Vo(s): 3-88092306 \$8092321</th> <th>, 88092291 -88092327</th> <th>1-8809229</th> <th>33</th> <th>ן י</th> <th>boratory</th> <th>Supers</th> <th>risor Ap</th> <th>proval:</th> <th></th> <th></th> <th></th>	OC Repor	t for Labora 8809 8809	tory Sample 1 2256, 8809230 2312-88092316	Vo(s): 3-88092306 \$8092321	, 88092291 -88092327	1-8809229	33	ן י	boratory	Supers	risor Ap	proval:			
n.d.c 88092256 88092256 11-04-88 10-11-88 7060 0.005 0.040 0.040 0.040 0.040 0.040 0.040 0.040 0.040 0.040 0.040 0.040															

#A = Not Applicable	NC = Not Calculated	ND = Not Detected
Cl = Concentration One	C2 = Concentration Tvo	
Relative Percent Difference (RPD) = $C_1 - C_2 \times 100$	(CI + C2)/2	

QUALLY CONTROL RESULTS SUMMAN VOLATILE ORGANICS EPA 8010/8020

VGC-W-0047-88

Water ug/I.

Sample Matrix:

QC Report No:

、有限特殊を持続を持続に対けるという。

710 S. Illinois Avenue ES Oak Ridge Suite F-103 Bill Hayden **OR001** Job No.: Address: Client: Attn:

37830 Oak Ridge, In.

Duluth ANGB

Project:

Laboratory Supervisor Approval:

10-25-88

Dilution Factor:

Date Reported:

9-25-88

9-12-88

Date Received: Nate Prepared: Date Analyzed:

Conc. Unit:

88092303-88092309, 88092312-88092317 88082256, 88092291-88092294 QC Report for Laboratory Sample No(s): 88092321, 88082189

			-		1				-		
Laboratory			 ,						ES	QC Limits	-
Sample No.	Compound	SA *	SR	MS	PR R	MSD	PR	RPD	RPD	SRecovery	
											.,.
	Halocarbons: 8010					,					

Laboratory Sample No.	Compound	SA÷	SR	MS	P.R	MSD	PR	RPD	ES RPD	QC Limits #Recovery
	Halocarbons: 8010									
88092321	 1.1-Dichloroethane	10	Q	9.59	96	9.28	93	m	92	70-130
	Trichloroethene	10	ON -	10.2	102	10:3	103	,	19	65-131
20		<u>:</u>	5	ι. Ο	<u> </u>	10.7	107	2	010	59-137
60	Aromatics: 8020									
8897092321	Benzene	10	1 20	30.8	108	30.8	108	0	1 20	56-146
	Toluene	10	<u>Q</u>	10.7	107	1 9.72	1 37 1	10	111	42-150
	Chlorobenzene	01	QN -	10.1	<u>.0</u>	9.37	16	7	36	76-133
Deletine Berg	Dalating Bandant Difference (DB) - MS	MS MSD v 100								

(MS + MSD) /2 Relative Percent Difference (FR)

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate

Sample Result SR = SA

Not Applicable Not Calculated Not Detected

Spike Addrd (concentration)

88-A1-DULU0149 1

		The state of the s	Suppose the said the	gard de	*****	genzas de electronista de la electronista della electronista de la electronista de la electronista de la electronista de la electronista de la electronista de la electronista de la electronista de la electronista de la electronista della electronista de la electronista de la electronista de la ele		. A.	, re un	. 4 4	* # · * · · · · · · · · · · · · · · · ·	ES QC Limits	RPD SRecovery		77	, ng	40 59-137		20 56-146	41 42-150	36 76-133		√₹ - ₽?	ble ted d
	VGC-W-0051-88	100	The second of th			NA.	,	roval:					RPD S	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	ry 	沙漠		~ ~		•		1 A A A A A A A A A A A A A A A A A A A	Not Applicable Not Calculated Not Detected
	VGC-W	11/8/12	Z Z	~		Z Z	, , , , ,	sor App		H					: 3	108	112		113	116	112			MA NC III
	QC Report No: Sample Matrix:	Unit:	Received:	Date Prepared:	Date Analyzed:	Date Reported: Dilution Factor:		Laboratory Supervisor Approval:		さつか			MSD		9.36	10.8	11.2		11.3	11.6	11.2	en der der eine Germannen der eine Germannen der eine Germannen der eine Germannen der eine Germannen der eine		Duplicate it (Concentration)
	QC Repo	Conc. U	Date Re	Date Pr	Dalte An	Dilutio		Laborat					i pr		6 - -	113	114		=======================================	114	105		g,	Sample Duplicate Result Added (Concentra
0/8020													MS		05.4	11.3	7 -		11.1	11.1	10.5		Spike Sample	Spike Sample Sample Result Spike Added (
EPA 8010/8020													SR		Ê	ON -	QN		2	2	3	0	MS = S	MSD = S SR = S SA = S
											80		SA		01	100	10		10	10	1.0	MSD) /2		100
	ORGÓJ	ES Oak Ridge	Rill Hayden	710 S. Illinois Avenue		Oak Kidge, in. 3/830	•	Caluth Angis	1.31	38092322-88092325	88092327-88092332 88092348-88092356, 88092388		Compound	Halocarbons: 8010	1 1.1-biehlo-oethane	Trichloroechene	Chlorobenzene	Aromatics: 8020	6 HO 7 HO 7	Toluene	Chlorobenzene	itive Percent Difference (PH) = MS -		(PE) = (MS or MSD) - SR x SA
l p		**	** , * ;	*****	2 2 2 2 2 2 2 2 2 2	٠	٠		acel Jacobson . "	,	* 3 * 1 's	\$ 1001 The 1200					20	61	70 To 1	•		and exist.	-,	inn jant heddreig

A STATE OF THE STA

CANCEL CO.

Application of the

CANADA CANADA

VOLATILE ORGANICS

A benchestering

Secretarion Pro-

Community of

THE PROPERTY OF

Compared the control of the control

OR001 Job No:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, Tn. 37830 Client: Attn: Address:

Duluth ANGB

Project:

Sample Matrix: Conc. Unit: Date Reported:

Water ug/L 10-28-88

Laboratory Supervisor Approval:

			,,,,,	
Inclusive Sample Nos.	88092323-88092325 880923 <i>2</i> 7	88092322 88092328-88092332	88092321	
CRDL	0.25	0.25	0.25	
Conc	1.4	7	4.6 0.44	
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane	Dichloromethane Chloroform	
CAS Number	75-09-2 67-66-3	75-09-2	75-09-2	
Instru- ment ID	Carbopack	Carbopack	Carbopack 75-09-2 67-66-3	
Fraction	VGC	VGC	VGC	
Date Analyzed	9-20-88	9-15-88	9-16-88	n angun saman angun saman saman saman samah samah saman darinn padabad
File ID	82	35	20	2062

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY WATER

Job No:

OROO1

QC Report No.:

.C2-W-0034-88

Client:

ES Oak Ridge

QC Sample No.: Level (Low/Med):

+3092306

Attn:

Bill Hayden

Date Reported:

Low 11-11-38

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

37830

Project:

4,47-DDT

Duluth ANGB

500

Laboratory Supervisor Approval:

78

38-127

0.392

DuBu in

QC Report for Laboratory Sample No(s).:

88092303-88092306, 88092291-88092293

88092423-88092427, 88092313-88092317

88092323-88092327

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/L)	MS Conc. In Extract (ug/L)	MS % Rec. "	QC Limits Rec.
Lindane	200	ND	ND	NC*	56-123
Heptachlor epoxide	200	ND	0.200	100	40-131
Aldrin	200	ND	0.226	113	40-120
Dieldrin	500	ND	0.577	115	52-126
Endrin	500	ND	0.516	103	56-121

	MSD Conc.	MSD %	MS %	%	CO Li	mits
	In Extract (ug/L)	Rec. #	Rec. #	RPD #	RPD	REC
Lindane	ND	NC*	NC*	NC*	15	56-123
Heptachlor epoxide	0.191	96	100	5	20	40-131
Aldrin	0.187	94	113	19	22	40-120
Dieldrin	0.478	96	115	19*	18	52-126
Endrin	0.465	93	103	10	21	56-121
4,4~-DDT	0.317	63	78	20	27	38-127

^{# -} Column to be used to flag recovery and RPD values with an asterisk

ND

NC - Not Calculated

RPD: 2 out of 6 outside limits

Spike Recovery: 2 out of 12 outside limits

88-A1-DULU0457 1

2063

^{* -} Values outside of QC limits

At all for rectain while to Novemble WATER

Job No: OR001 QC Report No.:

OCP-W-0034-88B

Client:

ES Oak Ridge

QC Sample No.:

Blank Low

Attn:

Bill Hayden

Level (Low/Med): Date Reported:

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830 11-11-88

Project:

Duluth ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s) .:

88092303-88092306, 88092291-88092293

88092313-88092317, 88092323-88092324 88092327, 88092423-38092427

AWBunton

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/L)	MS Conc. In Extract (ug/L)	MS % Rec. #	QC Limits Rec.
Lindane	200	ND.	0.177	89	56-123
Heptachlor epoxide	200	Q.,	0.194	97	40-131
Aldrin	200	<i>G</i> .	0.181	91	40-120
Dieldrin	500	D	0.487	97	52-126
Endrin	500	פא	0.458	92	56-121
4,4~-DDT	500	G7.	0.388	78	38-127

	MSD Conc.	\ \vec{v}		•/	QC Lia	iits
	<pre>In Extract (ug/L)</pre>	MSD % Rec. #	MS % Rec. #	RPD #	RPD	REC
Lindane	0.0110	6*	89	179*	15	56-123
Heptachlor epoxide	0.0141	7*	97	180*	20	40-131
Aldrin	ND	ИС*	91	NC*	22	40-120
Dieldrin	0.0333	7*	97	177*	18	52-126
Endrin	0.0322	6*	92	176*	21	56-121
4,47-DDT	0.0279	6*	78	171*	27	38-127

^{# -} Column to be used to flag recovery and RPD values with an asterisk

Spike Recovery: 6 out of 12 outside limits

^{* -} Values outside of QC limits

NC - Not Calculated

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: OCP-W-0034-88 QC REPORT NO.: OCP-W-0034-88B

Analysis of matrix spikes showed lindane to be not quantifiable because i: was swamped by an interference. The RPD for dieldrin was slightly higher than EPA QC guidelines. When spiked blanks were analyzed, an interference made the aldrin response not quantifiable. In addition, the blank spike recoveries were essentially twice what they should have been, while recoveries from the duplicate were close to zero. This suggests that the blank spike was spiked twice and the duplicate not at all. However, when the data associated with these analyses were closely examined, no analytical errors were found.

Hepthchlor epoxide was inadvertently used instead of heptachlor in the matrix spiking solution.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

2065

88-A1-DULU0461 1

CN-FRM01

PESTICIDE METHOD BLANK SUMMARY

Job No.:

OROO1

Lab Name:

Engineering Science

Lab Sample No.:

Elank

Client:

ES Oak Ridge

Attn:

Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830 Matrix:

Hater ಹಿಂಬ

Level (low/med):

Extraction:

(SepF/Cont/Sonc): -Sonc

Date Reported:

11-11-88

Project:

Duluth ANGB

Date Extracted:

9-15-88

Date Analyzed (1): 10-15-88

Time Analyzed (1): 14:15

Instrument ID (1): HP5890 #2 GG Column ID (1): OV-1

Date Analyzed (2): 10-19-88 Time Analyzed (2): 20:14

Instrument ID (2): EP5880

GC Column ID (2): Mixed

This Method Blank applies to the following samples, MS and MSD.

EPA Sample No.	Lab Sample ID (!)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2
_	88092313	10-15-88	88092313	10-19-88
-	88092314	10-15-88	88092324	10-19-88
-	88092315	10-15-88	88092327	10-19-88
_	88092316	10-15-88		
-	88092317	10-15-88		1
-	88092323	10-15-88		!
-	88092324	10-15-88		
_	88092327	10-15-88		į
				i 1
				1
				i
				i
	•			
				•.
				•
				1
				ł
<u> </u>		1		

A a more market.													
The same of the sa	5-88									••			l
	TPH-S-0075-88	mg/KG		9-22-88	9-23-88	11-02-88				spproval		X	
	TP	9 8	NA	Ġ	Ġ	Ξ	NA	NA		visor A	C	なく	
	No:		ved:	red:	zed:	ted:	actor:			Super	٦٩	りなうくらラブジ	
EIVIROPHENTAL QUALITY PARAHETERS PETROLEUM HYDROCARBONS	QC Report No:	Conc. Unit:	Date Received:	Date Prepared:	Date Analyzed:	Date Reported:	Dilution Factor:	%hoisture:		Laboratory Supervisor Approval:			
• pasonini madering				ıne		37830					s):		
ф. Попурнячици.				ts Aver							le Ro(1777	7.55
Chical meseration		Ridge	yden	Illino	-103	ge, Tn			AUGIS		y Samp	3-6509	4-896.7
Bildermae - Bergs	0R001	ES Oak Ridge	Bill Hayden	710 S. Illinots Avenue	Suffe F-103	Oak Ridge, Th.			buluth ANGB		aborator	88092223-85092227	8-10-09-00-00-00-00-00-00-00-00-00-00-00-00
Tenses and the second of											1 or 1.		
STORY OF T	Job No.:	Client:	At. cm:	Address:					Project:		(f. Report 1 or Laboratory Sample Ro(s):		
1	7	Ç	⋖,	~									

The state of the s

islan, 418.1 <10 8.63 39.5 38.5 76 37.5 73 3 ***	Laboratory Anal Sample do. Nethod Blan	Anal	B] ank	SR	SA	MS	PR	MSD	PR	RPD	Notes
	31 401.	418.1	<10	8.6.4	39.5	38.5	91	37.5	73	æ	*

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

2067

See Legend attached. The reporting limit for the sample in this batch is provided by the sub-contract laboratory.

MS = Spike Campile	MSD = Spike Duplicate
MS - MSD X 100	(11S + MSD)/2
Ħ	•
(RPD)	
rcent Difference	
Perc	
Relative	

Percent Recovery (PR) = $88R + 8R \times 100$

NA = Not Applicable NC = Not Galculated ND = Not Detected

VOLATILE COM	NTINUIN	G CALIE	RATION	CHECK	50.1 0 120	
LabName:	- 	C c	ontract:_			
Lab Code: Case N	No.:		SAS No.	:	SDG No.	
Instrument ID.: CARbopak						
LAB FILE ID: 77 578	Init.	Calib.	Date(s)	:9/13/89	9/1	4/99
COMPOUND	RRF	RRF50	% D		88 ¢ ¢	23.
•	0.32	0.16	<u> 5</u> 2			* * * =
bis (2-chloroethoxy		<u> </u>				
methane		·				23-1
bis (2-chloroisopropyl		!		-		5-60
ether Bromobenzene	1.0	1.2	90			
Bromodichloromethane			'_ -24 /'			•
Bromoform			21			£ .
Bromomethane	0-20	10.19	5			٠.
Carbon tetrachloride	4.2	1 4.8	14 1			
Chloroacetaldehyde						- 41
Chlorobenzene	1.4	1 16	14 !			· .
Chloroethane	072	10.59	1_141			
Chloroform	54	14.8	اا			
1-Chorohexane	257	11.0	<u>15</u>			
2-Chloroethyl vinyl ether_		1	اا			
Chloromethane	<u>0 47</u>	0.44	<u> </u>			
Chloromethyl methyl ether_		<u> </u>				
o_,m_,& p_Chlorotoluenes _	_ <u>크</u>	4.1	32			
Dibromochloromethane	37	4.4				,
Dibromomethane	<u> </u>	300	 16			
1,2_Dichlorobenzene		2.5	19			
1,3_Dichlorobenzene	21	3.4	'_L' ' i4			
1,4_Dichlorobenzene Dichlorodifluormethane	¦ -	1	¦- '-'-			
1,1_Dichloroethane	2.4	2.5	4			
1,2_Dichloroethane	36	24	0			
1,1_Dichloroethylene	2.6	1 7	4			
trans_1,2_dichloroethylene		2.7	13			
Dichloromethane	4.1	3 3	20			
1,2_Dichloropropane	2.4	2.7	1 13			
1,3_Dichloropropylene	4.5	15.2	16			
1,1,2,2_Tetrachlorocthane_	7.5	1 3.4	1_12_1			
1,1,1,2_Tetrachloroethane_		14.5	- <u> 0</u>			
Tetrachloroethylene	1 <u> </u>	1-8.4	1 <u>12</u>			
1,1,1_Trichloroethane	1 <u>3.0</u>	134	1_13_1			
1,1,2_Trichloroethane	4.5	15:3	1	•		
Trichloroethylene	40	14.5	1-43-			
		<u>। डॅ</u> न्ते -	! !!			
Trichloropropane	<u> </u>		السطيا			
Vinvl chloride	: U74	10 91				

file: 8020CONT 3 Nov 88

Xylenes__

VOLATILE CONTINUING CALIBRATION CHECK LabName:___ _____ Contract:___ Lab Code:_____ Case No.:____ SAS No.:____ SDG No.:____ Instrument ID.: CARboyak Calibration Date(s): 1/20/89 LAB FILE ID: 77 Inst. Calib. Date(s): 9/13/89 RRF COMPOUND RRF50 %D Benzene_ Chlorobenzene_ 1,2_Oichlorobenzene_ 1,3_Dichlorobenzene_ 1,4_Dichorobenzene__ Ethyl Bazene___ Toluene_

This page intentionally left blank.

DATA PACKAGE #34

This page intentionally left blank.

Job No.: OROO1

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the water samples received by this laboratory on 9-10-88 and 9-12-88.

Sample Preparation Data

Laboratory	Client		Date	Date*	Date	Date*
Sample No.	Sample ID	Test	collected	extracted	analyzed	2nd col.
88092312	DANGB-4-MW23-GW1	BA-I	9-09-88		10-17-88	
88092312	DANGB-4-MW23-GW1	CD-F	9-09-88		10-24-88	
88092312	DANGB-4-MW23-GW1	CR-F	9-09-88		10-28-88	
88092312	DANGB-4-MW23-GW1	PB-F	9-09-88		10-20-88	
88092312	DANGB-4-11W23-GW1	418.1	9-09-88	9-28-88	10-05-88	
88092312	DANGB-4-MW23-GW1	8010	9 - 09 - 88		9-16-88	9-14-88
88092312	DANGB-4-MW23-GW1	8020	9-09-88		9-16-88	
88092313	DANGB-8-GV8C-GV1	BA-I	9-09-88		10-17-88	
88092313	DANGB-8-GV8C-GW1	CD-F	9-09-88		10-24-88	
88092313	DANGB-8-GW8C-GW1	CR-F	9-09-88		10-28-88	
88092313	DANGB-8-GW8C-GW1	PB-F	9-09-88		10-20-88	
88092313	DANGB-8-GW8C-GW1	8010	9-09-88		9-16-88	9-14-88
88092313	DANGB-8-GW8C-GW1	8020	9-09-88		9-16-88	
88092313	DANGB-8-GV8C-GW1	8080	9-09-88	9-15-88	10-16-88	10-19-83
88092314	DANGB-8-MW17-GW1	BA-I	9-09-88		10-17-88	·
88092314	DANGB-8-MW17-GW1	CD-F	9-09-88		10-24-88	
88092314	DANGB-8-MW17-GW1	CR-F	9-09-88		10-28-88	
88092314	DANGB-8-MW17-GW1	PB-F				
88092314	DANGB-8-MW17-GW1		· ·	9-28-88		
88092314				5 00		9-15-88
88092314	DANGB-8-MW17-GW1	8080	9-09-88	9-15-88	10-16-88	10-19-88
	Sample No. 88092312 88092312 88092312 88092312 88092312 88092312 88092313 88092313 88092313 88092313 88092313 88092313 88092314 88092314 88092314 88092314 88092314 88092314 88092314 88092314 88092314 88092314	Sample No. Sample ID 88092312 DANGB-4-MW23-GW1 88092312 DANGB-4-MW23-GW1 88092312 DANGB-4-MW23-GW1 88092312 DANGB-4-MW23-GW1 88092312 DANGB-4-MW23-GW1 88092312 DANGB-4-MW23-GW1 88092313 DANGB-4-MW23-GW1 88092313 DANGB-8-GW8C-GW1 88092313 DANGB-8-GW8C-GW1 88092313 DANGB-8-GW8C-GW1 88092313 DANGB-8-GW8C-GW1 88092313 DANGB-8-GW8C-GW1 88092314 DANGB-8-MW17-GW1 88092314 DANGB-8-MW17-GW1	Sample No. Sample ID Test 88092312 DANGB-4-MW23-GW1 BA-I 88092312 DANGB-4-MW23-GW1 CD-F 88092312 DANGB-4-MW23-GW1 CR-F 88092312 DANGB-4-MW23-GW1 PB-F 88092312 DANGB-4-MW23-GW1 8010 88092312 DANGB-4-MW23-GW1 8020 88092312 DANGB-4-MW23-GW1 8020 88092313 DANGB-8-GW8C-GW1 BA-I 88092313 DANGB-8-GW8C-GW1 CD-F 88092313 DANGB-8-GW8C-GW1 CR-F 88092313 DANGB-8-GW8C-GW1 8010 88092313 DANGB-8-GW8C-GW1 8020 88092314 DANGB-8-MW17-GW1 BA-I 88092314 DANGB-8-MW17-GW1 CD-F 88092314 DANGB-8-MW17-GW1 CR-F 88092314 DANGB-8-MW17-GW1 CR-F 88092314 DANGB-8-MW17-GW1 CR-F 88092314 DANGB-8-MW17-GW1 418.1 88092314 DANGB-8-MW17-GW1 8010 8809231	Sample No. Sample ID Test collected 88092312 DANGB-4-MW23-GW1 BA-I 9-09-88 88092312 DANGB-4-MW23-GW1 CD-F 9-09-88 88092312 DANGB-4-MW23-GW1 CR-F 9-09-88 88092312 DANGB-4-MW23-GW1 PB-F 9-09-88 88092312 DANGB-4-MW23-GW1 8010 9-09-88 88092312 DANGB-4-MW23-GW1 8020 9-09-88 88092312 DANGB-4-MW23-GW1 8020 9-09-88 88092313 DANGB-8-GW8C-GW1 BA-I 9-09-88 88092313 DANGB-8-GW8C-GW1 CD-F 9-09-88 88092313 DANGB-8-GW8C-GW1 CR-F 9-09-88 88092313 DANGB-8-GW8C-GW1 RD-F 9-09-88 88092313 DANGB-8-GW8C-GW1 8010 9-09-88 88092313 DANGB-8-GW8C-GW1 8020 9-09-88 88092314 DANGB-8-GW8C-GW1 800 9-09-88 88092314 DANGB-8-MW17-GW1 BA-I 9-09-88 88092314 <th>Sample No. Sample ID Test collected extracted 88092312 DANGB-4-MW23-GW1 BA-I 9-09-88 88092312 DANGB-4-MW23-GW1 CD-F 9-09-88 88092312 DANGB-4-MW23-GW1 CR-F 9-09-88 88092312 DANGB-4-MW23-GW1 PB-F 9-09-88 88092312 DANGB-4-MW23-GW1 418.1 9-09-88 88092312 DANGB-4-MW23-GW1 8010 9-09-88 88092312 DANGB-4-MW23-GW1 8020 9-09-88 88092313 DANGB-8-CUREC-GW1 BA-I 9-09-88 88092313 DANGB-8-GW8C-GW1 CD-F 9-09-88 88092313 DANGB-8-GW8C-GW1 PB-F 9-09-88 88092313 DANGB-8-GW8C-GW1 8010 9-09-88 88092313 DANGB-8-GW8C-GW1 8020 9-09-88 88092314 DANGB-8-GW8C-GW1 8080 9-09-88 88092314 DANGB-8-MW17-GW1 BA-I 9-09-88 88092314 DANGB-8-MW17-GW1 CR-F 9-09-88</th> <th>Sample No. Sample ID Test collected extracted analyzed 88092312 DANGB-4-MW23-GW1 BA-I 9-09-88 10-17-88 88092312 DANGB-4-MW23-GW1 CD-F 9-09-88 10-24-88 88092312 DANGB-4-MW23-GW1 PB-F 9-09-88 10-20-88 88092312 DANGB-4-MW23-GW1 418.1 9-09-88 9-28-88 10-05-88 88092312 DANGB-4-MW23-GW1 8010 9-09-88 9-16-88 8092312 88092312 DANGB-4-MW23-GW1 8010 9-09-88 9-16-88 8092312 88092313 DANGB-8-GW8C-GW1 BA-I 9-09-88 9-16-88 8092313 88092313 DANGB-8-GW8C-GW1 BA-I 9-09-88 10-24-88 8092313 DANGB-8-GW8C-GW1 CR-F 9-09-88 10-24-88 8092313 DANGB-8-GW8C-GW1 RB-F 9-09-88 10-22-88 8092313 DANGB-8-GW8C-GW1 8010 9-09-88 9-16-88 8092313 DANGB-8-GW8C-GW1 8020 9-09-88 9-15-88 10-20-88</th>	Sample No. Sample ID Test collected extracted 88092312 DANGB-4-MW23-GW1 BA-I 9-09-88 88092312 DANGB-4-MW23-GW1 CD-F 9-09-88 88092312 DANGB-4-MW23-GW1 CR-F 9-09-88 88092312 DANGB-4-MW23-GW1 PB-F 9-09-88 88092312 DANGB-4-MW23-GW1 418.1 9-09-88 88092312 DANGB-4-MW23-GW1 8010 9-09-88 88092312 DANGB-4-MW23-GW1 8020 9-09-88 88092313 DANGB-8-CUREC-GW1 BA-I 9-09-88 88092313 DANGB-8-GW8C-GW1 CD-F 9-09-88 88092313 DANGB-8-GW8C-GW1 PB-F 9-09-88 88092313 DANGB-8-GW8C-GW1 8010 9-09-88 88092313 DANGB-8-GW8C-GW1 8020 9-09-88 88092314 DANGB-8-GW8C-GW1 8080 9-09-88 88092314 DANGB-8-MW17-GW1 BA-I 9-09-88 88092314 DANGB-8-MW17-GW1 CR-F 9-09-88	Sample No. Sample ID Test collected extracted analyzed 88092312 DANGB-4-MW23-GW1 BA-I 9-09-88 10-17-88 88092312 DANGB-4-MW23-GW1 CD-F 9-09-88 10-24-88 88092312 DANGB-4-MW23-GW1 PB-F 9-09-88 10-20-88 88092312 DANGB-4-MW23-GW1 418.1 9-09-88 9-28-88 10-05-88 88092312 DANGB-4-MW23-GW1 8010 9-09-88 9-16-88 8092312 88092312 DANGB-4-MW23-GW1 8010 9-09-88 9-16-88 8092312 88092313 DANGB-8-GW8C-GW1 BA-I 9-09-88 9-16-88 8092313 88092313 DANGB-8-GW8C-GW1 BA-I 9-09-88 10-24-88 8092313 DANGB-8-GW8C-GW1 CR-F 9-09-88 10-24-88 8092313 DANGB-8-GW8C-GW1 RB-F 9-09-88 10-22-88 8092313 DANGB-8-GW8C-GW1 8010 9-09-88 9-16-88 8092313 DANGB-8-GW8C-GW1 8020 9-09-88 9-15-88 10-20-88

* If applicable



Job No.:

ORO01

Project:

Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092315	DANGB-8-MW16-GW1	BA-I	9-09-88		10-17-88	
88092315	DANGB-8-MW16-GW1	CD-F	9-09-88		10-24-88	
88092315	DANGB-8-MW16-GW1	CR-F	9-09 - 88		10-28-88	
88092315	DANGB-8-MW16-GW1	PB-F	9-09-88		10-20-88	
88092315	DANGB-8-MW16-GW1	418.1	9-09-88	9-28-88	10-05-88	
88092315	DANGB-8-MW16-GW1	8010	9 - 09-88		9-16-88	9-15-88
88092315	DANGB-8-MW16-GW1	8020	9-09-88		9-16-88	
88092315	DANGB-8-MW16-GW1	8080	9-09 - 88	9-15-88	10-16-88	10-19-88
88092316	DANGB-BR2	BA-I	9~09-88		10-17-88	
88092316	DANGB-BR2	CD-F	9-09-88		10-24-88	
88092316	DANGB-BR2	CR-F	9-09-88		10-28-88	
88092316	DANGB-BR2	PB-F	9-09-88		10-20-88	
88092316	DANGB-BR2	418.1	9-09-88	9-28-88	10-05-88	
88092316	DANGB-BR2	8010	9-09-88		9-16-88	9-15-88
88092316	DANGB-BR2	8020	9-09-88		9-16-88	
88092316	DANGB-BR2	8080	9-09-88	9-15-88	10-16-88	10-19-88
88092317	DANGB-8-MW15-GW1	BA-I	9-09-88		10-17-88	
88092317	DANGB-8-MW15-GW1	CD-F	9-09-88		10-24-88	
88092317	DANGB-8-MW15-GW1	CR-F	9-09-88		10-28-88	
88092317	DANGB-8-MW15-GW1	PB-F	9-09-88		10-26-88	•
88092317	DANGB-8-MW15-GW1	418.1	9-09-88	9-28-88	10-05-88	
88092317	DANGB-8-MW15-GW1	8010	9-09-88		9-16-88	9-15-88
88092317	DANGB-8-MV15-GW1	8020	9-09-88		9-16-88	
88092317	DANGB-8-MW15-GW1	8080	9-09-88	9-15-88	10-16-88	10-19-88

^{*} If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88092312-88092317
WORK ORDER NO.: 960

These water samples were received at the ES Berkeley Laboratory on 9-10-88 and 9-12-88. They were received cold and intact.

2075

ENGINEERING-SCIENCE INC. 11/21/88

PAGE 1

ANALYSIS REPORT

JRK ORDER NUMBER: 960

38 NUMBER : 280000000440

APPROVED BY _

Lab Supervisor

IPORT DATA:

3 OAK RIDGE/DULUTH ANGB

ORK ORDER DATE : 09/12/88

O S. ILLINOIS AVE. STE. S103

\K RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES DAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

\SK: 2, UNITS: mg/L

:ST COMPOUND	DANGB-4-MW23- GW-1 88092312	DANGB-8-GW8C- GW-1 88092313	DANGB-8-MW17- GW-1 88092314	DANGB-8-MW16- GW-1 88092315	DANGB-BR2 88092316	DANGB-8-MW15- GW-1 88092317
CID DIG FLAME	NA	NA	NA	NA	NA	NA
ID DIG FURNACE	NA	NA	NA	NA	NA	NA
RIUM	0.14	0.22N	0.15BN	<0.05N	<0.05N	<0.05N
\DMIUM	<0.001	<0.001	<0.001	<0.001	<0.001 W	<0.001W
ROMIUM	0.0024 B	0.0027B	0.0027 B	0.0021B	<0.002	<0.002W
:AD	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

- Not Detected

A - Not Analyzed

ENGINEERING-SCIENCE INC. 11/21/88

PAGE 2

ANALYSIS REPORT

FORK ORDER NUMBER: 960

3 JOB NUMBER : 28000000440 WORK ORDER DATE : 09/12/88

APPROVED BY Lab Supervisor

REPORT DATA:

IS OAK RIDGE/DULUTH ANGB

STE. S103

710 S. ILLINOIS AVE. STE. S103 710 S. ILLINOIS AVE. STE. S103

CAK RIDGE, TN 37830

31LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

: BILL HAYDEN

(615)-481-3920

(ASK: 3, UNITS: mg/L

Ctudents sector	FEST COMPOUND	DANGB-4-MW23- GW-1 88092312	DANGB-8-GW8C- GW-1 88092313	DANGB-8-MW17- GW-1 88092314	DANGB-8-MW16- GW-1 88992315	DANGB-BR2 88092316	DANGB-8-MW15- GW-1 88092317
,	418.1 PETROLEUM HYDROCARBONS	<1.5	NT	<1.5	<1.5	<1.5	<1.5

ND - Not Detected

IT - Not Tested

ENGINEERING-SCIENCE INC. 11/21/88

PAGE 3

ANALYSIS REPORT

ORK ORDER NUMBER: 960

38 NUMBER : ZB000000440

APPROVED BY ___

ORK ORDER DATE : 09/12/88

Lab Supervisor

SPORT DATA:

CLIENT DATA:

3 OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

4K RIDGE, TN 37830

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

ILL HAYDEN

OF REPORT COPIES: 1

ONTRACT / PO # : OR001

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/L, GROUP 8010

	DANGB-4-MW23- GW-1	DANGB-8-GW8C- GW-1	DANGB-8-MW17- GW-1	DANGB-8-MW16- GW-1	DANGB-BR2	DANGB-8-MW15- GW-1
IST COMPOUND	88092312	88092313	88092314	88092315	88092316	88092317
ENZYL CHLORIDE	ND	ND	ND	ND	ND	ND
:S (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND	ND
'S (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND	ND
COMOBENZENE	ND	ND	ND	ND	ND	ND
ROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND
<omoform< th=""><td>ND</td><td>ND</td><td>ND</td><td>ND</td><td>ND</td><td>ND</td></omoform<>	ND	ND	ND	ND	ND	ND
ROMOETHANE	ND	ND	ND	ND	ND	ND
ARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
∃LORACETALDEHYDE	ND	ND	ND	ND	ND	ND
⊀LORAL	ND	ND	ND	ND	ND	ND
LOROBENZENE	ND	ND	ND	ND	ND	ND
⊀LOROETHANE	ND	ND	ND	ND	ND	ND
- ILOROFORM	ND	ND	0.16B	0.14B	0.65B	ND
- CHLOROHEXANE	ND	ND	ND	ND	ND	ND
·CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
!LOROMETHANE	ND	ND	ND	ND	ND	ND
HOROMETHYL METHYL ETHER	ND	ND	ND	ND	ND	ND
LOROTOLUENE	ND	ND	ND	ND	ND	ND
BROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND
, 2-DICHLORGBENZENE	ND	ND	ND	ND	ND	ND
3-DICHLOROSENZENE	ND	ND	ND	ND	ND	ND
.4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
CHLOROD I FLUOROMETHANE	ND	ND	ND	ND	ND	ND
1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
1-DICHLOROETHYLENE	NO	ND	ND	ND	ND	ND
ANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	5.3B	2.2B	0.77B	0.128	6.68	2.8B
2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND

^{· -} Not Detected

ENGINEERING-SCIENCE INC. 11/21/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 960

TEST COMPOUND	DANGB-4-MW23- GW-1 88092312	DANGB-8-GW8C- GW-1 88092313	DANGB-8-MW17- GW-1 88092314	DANGB-8-MW16- GW-1 88092315	DANGB-BR2 88092316	DANGB-8-MW15- GW-1 88092317
당 			***********	************		***************************************
🗓 ,3-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
3 1,1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
* 'ETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND
™1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
§ 'RICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
RICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND	ND
TRICHLOROPROPANE	ND	ND	ND	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND

ND - Not Detected

ANALYSIS REPORT

ORK ORDER NUMBER: 960

38 NUMBER : 28000000440 ORK ORDER DATE : 09/12/88

APPROVED BY __

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

K RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/L, GROUP 8020

ST COMPOUND	DANGB-4-MW23- GW-1 88092312	DANGB-8-GW8C- GW-1 88092313	DANGB-8-MW17- GW-1 88092314	DANGB-8-MW16- GW-1 88092315	DANGB-BR2 88092316	DANGB-8-MW15- GW-1 88092317
ENZENE	ND	ND	ND	ND	ND	ND
LOROBENZENE	ND	ND	ND	ND	ND	ND
2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
HYL BENZENE	ND	ND	ND	ND	ND	ND
CLUENE	ND	ND	ND	ND	ND	ND
'LENES	ND	ND	ND	ND	ND	ND

ANALYSIS REPORT

FORK ORDER NUMBER: 960
108 NUMBER : 280000000440

APPROVED BY

Lab Supervisor

WORK ORDER DATE : 09/12/88

CLIENT DATA:

EPORT DATA:

710 S. ILLINOIS AVE. STE. S103

TAK RIDGE, TN 37830

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : OROO1

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/L, GROUP 8080

-	DANGB-8-GW8C-	DANGB-8-MW17-	DANGB-8-MW16-	DANGB-BR2	DANGB-8-MW15-
9.00 p. 1.00 p	GW-1	GW-1	GW-1		GW-1
EST COMPOUND	88092313	88092314	88092315	88092316	88092317
3 ALDRIN	ND	ND	ND	ND	ND
LPHA BHC	ND	ND	ND	ND	ND
ETA-BHC	ND	ND	ND	ND	ND
DELTA-BHC	ND	ND	ND	ND	ND
: AMMA-BHC	ND	ND	ND	ND	ND
HLORDANE	ND	ND	ND	ND	ND
4,4*-DDD	ND	ND	ND	ND	ND
4,41-DDE	ND	ND	ND	ND	ND
.,41-DDT	ND	ND	ND	ND	ND
. IELDRIN	ND	ND	ND	ND	ND
ENDOSULFAN I	ND	ND	ND	ND	ND
FNDOSULFAN II	ND	ND	ND	ND	ND
,NDOSULFAN SULFATE	ND	ND	ND	ND	ND
LNDRIN	ND	ND	ND	ND	ND
ENDRIN ALDEHYDE	NA	NA	NA	NA	NA
, EPTACHLOR	ND	ND	ND	ND	ND
EPTACHLOR EPOXIDE	ND	ND	ND	ND	ND
KEPONE	NA	NA	NA	NA	NA
METHOXYCHLOR	ND	ND	ND	ND	ND
OXAPHENE	ND	ND	ND	ND	ND
CB-1016	ND	ND	ND	ND	ND
PCB-1221	ND	ND	ND	ND	ND
PCB-1232	ND	ND	ND	ND	ND
CB-1242	ND	ND	ND	ND	ND
¹ . CB-1248	ND	ND	ND	ND	ND
PCB-1254	ND	ND	ND	ND	ND
rCB-1260	ND	ND	ND	ND	ND

ND - Not Detected

¹'A - Not Analyzed

ENGINEERING-SCIENCE Just print chain of custody record 960,963 Jalels Subst Samples received cold and intect ENGINEERING-SCIENCE 882314 Date/Time | Received by: (Signature) 882319 LABORATORY, INC. 882319 582314 *117.5 582331 Berkeley, CA 94710 600 Bancroft Way xxx3346 REMARKS 98034 T 882815 WATER ANALYSES REQUIRED Relinquished by: (Signature) 109/12/14:00 Date/Time × TAINERS CON-. 9 (Bignetiure) / Laboratory by: 5 2 4 40/12 Hawald Links v (1) Received by: (Signature) 9490314293 FEDER ALL BILL IF DANGB - 4 - MW- 4-6W-1-188 DANGB-8-MW17-6W-1 - MM16-GW-1 DANGE-8-6W8C-6W-Duluth ANGB/Duluth, Mn. SAMPLE DESCRIPTION DANCE - 8 - MWIS-GW 004 88 1200 9-7-84 0950 0 DANGIS - +132 Date/Time PROJECT NAME/LOCATION DANUB- BRZ CD4NG B- FR 4 UGZO O DANCE - FBS DANGIS-5 Melingulahed by: (Signature) Relinquished by: (Signature) SAMPLEM 8): (Signatyre) 9-9-84 0730 995× 0840 99-48 08.30 0440 0011 8-46 9-9-87 1330 THE 14A5 ES JOB NO. **OR001** 448 DATE थ कर%

Distribution: Original Accompanies Skipment, Copy to Coordinator Field Files

ENGINEERING-SCIENCE

Brank Shiphing

960

Constitution of

POSTORINA (Pr.)

Section of the second

CHAIN OF CUSTODY RECORD

5 •	ES JOB NO.	PROJECT NAME/LOCATION		,	WATER ANALYSES	3 / 100 100
ö	OR001	Duluth ANGB/Duluth, Mn.	Ŏ.		HEQUIRED	E
	May 2 San		OF CON-		3/16	600 Baneroft Way Berkeley, CA 84710
DATE	TIME	SAMPLE DESCRIPTIONS	TAINERS			REMARKS
18-6-6	F 1330	DANGB-4- MWZI-6W-1	4		\frac{1}{2}	•
-9-38	9-9-88 1445	-	2			.
9-8	9-6-86 1330					616866
						7,0200
		M. J. O. J.				
	1					
			-			
ling.	ished by:	Melinquished by: (Signature) Colo, Time, Received by: (Signature) Fed Ex A. I. B. U. #	= 1	Melinquished by; (Signature)		Date/Time Received by: (Signature)
\$ C	lehed by:	Melinquished by: (Mgnature) Date/Time Received for Laboratory	۾ ۾	Dete/Time Re-	morke Samp est was not	9-10-90/11:00 itself.
		The Authority Charles	1			,

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD

	ES JOB NO.	PROJECT NAME/LOCATION			M.A.	TER ANAL	YSES	
0 1	OR001	Duluth ANGB/Duluth, Mn.	NO.			REGURED	0	ENGINERING-SCIENCE
	Loss Ca	Llod 2. Suns	CON-	0101			No.	600 Baneroft Way Berkeley, CA 94710
	TIME	SAMPLE DESCRIPTION TA	TAINERS	* 00 Ms			92.5	REMARKS
	9-9-48 0730	DANG 13- 13/22	9	X	X	X		882316
- 1	0840	DANGB-8-MW15-GW-1	e	×	× × ×			382317
1								7000
- 1								
- 1								
1	1							
					+			
1	1				+			
1	1				#			
					+			
1 1					+			
L I								
15 5 1	Melinquished by:	by: (Signature) Date/Itme Received by: (Signature) A A . C. 10 00 14 do 3/429 3	€	Relinquished by: (Signature)	d by: (Sig	nature)	Date/Time	me Received by: (Signature)
.	60 by:	Relinquished by: (Signature) Date/Time Received for Laboratory (Signature)	by:	9-10-8 11:20	ne Remerke	1	Samples intact	Received Coldana

graphical process

A MANAGEMENT A

大小山地道山東

THE PROPERTY.

THE PROPERTY OF Britis councils. 1

136

FOUNDATION OF THE PROPERTY AND PROPERTY

CHAIN OF CUSTODY RECORD

ES JOB NO.	B NO.	PROJECT NAME/LOCATION			WAT	WATER ANALYSES REQUIRED	YSES D	WIP TO:
OR001	001	Duluth ANGB/Duluth, Mn.	2			10/0	1/8	ENGMERMIG-BORNCE LABORATORY, INC.
SAMPL	ESK SI: (1	Honotare	<u>.</u>	•	<u> </u>			
17	Llosh	Mosty 2. Van	CON-		13			Berkeley, CA 84710
DATE	11100	SAMPLE DESCRIPTION	TAINERS					HEMARKS
4-9-83	9-1-88 0940	DANGB-8-MW17-6W-1	و.	X	(X		882314	314
4-9-81	1100		(0)	X	$\times \times \times$		388	982315
		`.						
							•	
		0						
	_							
Pallng	yd bedeli	_	# 42	Relinquiched by: (Signature)	d by: (Sig	insture)	Date/Time Re	Received by: (Signature)
*\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	7 h	1 New 9-9-87 1800 4490314293						1
Peline.	ished by	Relinquished by: (Signature) Date/Time Reived for Laboratory by:	tory by:	Date/Time	ne Remarks	_ `~	intact.	Kecanos Cold
		Girls Anila		9-10-35/11:00				÷
ل		۱			1			

Distribution: Orisinal Accompanies Shinmary Cany in Constitution First Files

2085

9490314293			ALS SHORE NAMES (New) Important	Department/Floor No.	a sip cotes!	4 94710	l'Address Noro	State ZIP Required	RED VALUE	In service conditions Figure 100 for the conditions Figure 1	And the state of \$100 per and the state of \$100 per and the state of \$100 per and the state of \$100 per and the state of \$100 per and the state of \$100 per and \$	The package is not a second of the package in the package is not a second of the package in the		ociver in style. The style ocity of the style ocity o	
MAIN. PACKAGE TRACKING NUMBER	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		injs Name) Please Print	Myncerny Science, Inc.	Exact Streethodress five commy defines in P. D. Bases or P.B. D. To Comes.)	Scholen C	IF NOLD FOR PICK-UP, Print FEDEX Address Nove	Š	SERVICE CONDITIONS, DECLARED VALUE	Use of this artistic and a content Security Secu	We set had to provide the state of 100 per control	The state of the s	The control of the co	Sender authorizes Federal Express to deliver this ship- ment without obtaining a delivery signature and shall indemnify and hold hamiless Federal Express from any claims resulting therefrom	Squiture
AIRBILL 151 THIS AINBILL FOR BOUGHTS SHIPMENTS WITHIN THE CONTINENTAL W.S.A. ALASKA AND NUMBER. 151 THI INTERNATIONAL AM WATHLE FOR SHIPMENTS IN PULLIE BECO. 181 THE STANDARD CARLON STANDARD S	4		You Phone Number (Nery Important) To (Recipe	Company	Exact Sirec	37830 Ciry BC	APPEAR ON INVOICE.J	cct. No	PACAASIS WINGHT TOWN OCCIOATS	1 52	25 1 M	[E3] Top Tobs!		_	12:1 6/1 -
DECTOTS AMBILL FOR BOMESTIC SAMMENTS OST THE INTERNITIONAL AIN WARDLE FOR SA PHISTMAN FALL BOB-238-3353 FOLL FALL	90314293	19/6/88	//	Sume, In	Illinus Ave.	Same Signer	MATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE)	Bis Peccent is Fode Acci ha. Bis 3rd Pary Fodes Acci ho Fil in Account Number Delow. Fil in Account Number Delow.	TELIVERY AND SPECIAL NANDLING	1 🗖 HOLD	3 DELIVER SATURDAY Assessment	131	7 OTHER SPECIAL SCANCE		12 The transmission of the same
の記憶電	PHP Internal Property of the Philipping Company	1196-4207-8	From (Your Name) Please Print	200	710 5.	on Cat Rula	YOUR BRELING KEFENENCÉ INFORMATI OR - OU	PAYMENT De Sender Be Paces	SERVICES	1 Demante 1 . 6 . LETTER	2 COUNTER-PAR 7	3 OPENENT 6	4 OWENNENT 9	S STANDARD 10 SAME AND SAME SAME SAME DATA SAME DATA SAME DATA SAME SAME SAME SAME SAME SAME SAME SAM	* Oversived Value Lund \$100
					20	88									

Difficial Cory

A CONTRACTOR OF THE PERSON OF

5.5

withing, are the

· The second of the second of

10000000

Personal designation

OR001 Job No.:

ES Oak Ridge Client: Attn:

Address:

710 S. Illinois Avenue Suite F-103 Bill Hayden

37830 Oak Ridge, In.

Sample Mairix: Billi Brenimini Of Report De: Cours. Unit:

11.11 ., ...

HT U-0031-FE

11-07-88 9-08-88

ni lui fon Faetor: Dalle Reported:

Project:

Duluth ANGB

QC Report for Laboratory Sample No(s):

88092291-88092293, 88092256, 88092303-88092306 88092312-88092317, 88092321-88092327

Laboratory Supervisor Approval:

Date Prep Date Anal Sample Nos. Spike Laboratory Duplicates Analyte

<0.2 6010

10-17-88 10-14-88

88092291

88092291

Barium

<0.05 <0.05

2.0

1.38 <0.05

269

Notes

쭚

Spike Recovery

S.

. P.D

Duplicate

Blank

Anal

Method

ច

2087

N - See Legend attached.

X 100 (c1 + c2)/2Relative Percent Difference (RPD) = C1 - C2

ercent Recovery (PR) = SSR - SR x 100

Cl = Concentration One = Concentration Two 3

NG = Not Applicable NG = Not Calculated ND = Not Detected

SSR = Spiked Sample Result SR = Sample Result

SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY METALS

The second secon

OR001 Job No.: ES Oak Ridge

Bill Hayden Address: Client: At tn:

710 S. Illinois Avenue Suite F-103 37830 Oak Ridge, In.

Dilution Factor: Date Reported: Sample Matrix: Date Received: Conc. Unit:

9-01-88 11-07-88

AAF-W-0032-88

QC Report No:

Water ng/L

Project:

Duluth ANGB

QC Report for Laboratory Sample No(s): 88092256, 88092303-88092306, 88092291-88092293 88092312-88092316, 88092321-88092327

Laboratory Supervisor Approval:

	Notes					
	R.	102	105	100	114	
	Spike Recovery SR SSR	0.0410	5.26	20.07	0.0229	
	Spike 1 SR	0.040 <0.005 0.0410	<0.00f 5.26	<0.002	0.020 <0.005 0.0229	
	SA	0.040	5.0	20.0	0.020	
	RPD	NC	NC	NG NG	NC	
	Duplicate Cl C2	<0.005	<0.001	<0.002	<0.005	
	CI D	<0.010 <0.005 <0.005	<0.005 <0.001 <0.001	<0.005 <0.002 <0.002	<0.010 <0.005 <0.005	
	Blank	<0.010	<0.005	<0.005	<0.010	
	Anal Method	2060	7131	6010	7421	
	Date Prep	11-04-88 10-11-88	10-26-88 10-11-88	10-28-88 10-11-88	10-11-88	
	Date Anal	11-04-88	10-26-88	10-28-88	10-20-88 10-11-88	
	Laboratory Sample Nos. Duplicates Spike	88092256	88092256	88092256	88092256	
	Laboratory Duplicates	88092256	88092256	88092256	88092256	
1	Analyte	Arsenic	Cadmium	Chromium	Pead pead	8

X 100 (c1 + c2)/2 $c_1 - c_2$ Relative Percent Difference (RPD) =

Percent Recovery (PR) = SSR - SR x 100

Cl = Concentration.One C2 = Concentration Two

NA = Not Applicable NC = Not Calculated ND = Not Detected

SSR = Spiked Sample Result

SR = Sample Result SA = Spike Added (Concentration)

Job No.:	OR001	11					ဗွ	QC Report No:	::0	AAF-	AAF-W-0031-88	88	
Clent:	C VI	ES Dak Ridge					San Co.	Sample Matrix:	ίχ:	Water	H		
A + + 6 = 6 + 6 + 6 + 6 + 6 + 6 + 6 + 6 +		מיקיים ווייקטיי					5 2	conc. dill.	•	1/8n	ug/L	•	
יין: יין:	1770	DILL nayden					ועה	Uate Kecelved:	: 00	*	31-38		
Address:	710	710 S. Illinois Avenue	enne				Pert	bate Reported:	:pa	<u></u>	11-07-88		
	Suft	_					בומ	Dilution Factor:	ctor:	٧N			
	Oak	Oak Ridge, In. 3	37830			`							
Project:	Dulu	Duluth ANGB											
							Lal	Laboratory Supervisor Approval:	Superv	sor Ap	proval:	í	
QC Report	t for Labora 8809 8809	<pre> \(\text{Keport for Laboratory Sample No(s):} \) 88092348-88092350, 8809 88092388-88092390, 8809</pre>	88092354-4 88092422-4	1-88092355, 2-88092427,	88092317	2 6	","	Frait	,		•		
	The state of the s												
Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	G I	Dupl Cate C2	RPD	· VS	Sp tke F	Spitke Recovery SR SSR	\$
Arsenic	88082189	88082189	10-26-88	10-18-88	7060	7060 <0.010 <0.005 <0.005	<0.005	<00.005	NC	0.040	0.040 <0.005 0.0517	0.0517	129N
Chromium	88082189	88082189	10-26-88	10-18-88	6010	<0.005	<0.005 <0.002 <0.002	<0.002	NC	20.0	<0.002 21.6	21.6	108
Lead 2	88082189	88082189	10-25-88	10-18-88	7421	<0.010	<0.010 <0.005 <0.005	<0.00>	NC NC	0.020	<0.005 0.0227	0.0227	114
) R 9												•	,
N - See L	Legend attached.	shed.											
Relative	Percent Dlf	Relative Percent Difference (RPD)	$= \frac{\text{C1 - C2}}{(\text{C1 + C2})/2}$	$\frac{c2}{2)/2} \times 100$		C1 # CC	ncentra	Concentration OneConcentration Two		11C = N	Not Appli Not Calcu	Applicable Calculated	
			•	•						H		cted	
Percent R	Recovery (PR)	SSR - SR	× 100	٠	-	SSR = SI SR = Si	Spiked Sample Sample Result Spike Added (C	Spiked Sample Result Sample Result Spike Added (Concentration)	ilt entrati	Cao			
							204						

Notes

The second of th

Signal Style

Children and A

A Alexander

Contactor (

TO MAKE THE PARTY OF THE PARTY

A CANADADADA

Q....TYKOL KESULYE JUNH. NO. METALS

American Company

Property and Par

CASSOCAL A

Panel Company

Significant and the contraction of the contraction

QUALLIL CONTROL RESOLIS SOLEMEN

· William Children and the contract of the con

12

VOLATILE ORGANICS EPA 8010/8020

	Sample Matrix: Water Conc. Unit: ug/L	Date Received: 9-12-88	Date Prepared: (A	Date Reported: 10-25-88	•
OR001	ES Oak Ridge	Bill Hayden	Suffe F-103	Oak Ridge, Tn. 37830	
Job No.:	Client:	Attn:	Adoress:		

Laboratory Supervisor Approval:

88082256, 88092291-88092294 88092303-88092309, 88092312-88092317 88092321, 88082189 QC Report for Laboratory Sample No(s):

Duluth ANGB

Project:

Y.	00092321, 00002109									
Laboratory Sample No.	Compound	vs	SR	W.S.	R	MSD	PR	RPD	ES RPD	QC Limits #Recovery
	Halocarbons: 8010					Management or recognition of the control of the con				
88092321	1,1-Dichloroethane	10	Q	9.59	96	9.28	93	m	- 56	70-130
2	Trichloroethene	10	ON -	10.2	102	10.3	103	- -	61	65-131
0	Chlorobenzene	<u>c</u> :	<u> </u>	10.3	1:3 5:	10.7	107	~	40	59-137
0	Aromatics: 8020			ellist- dat de elle en elle elle elle elle elle ell					****	
8897092321	Benzene	10	50	30.8	108	30.8	108	0	S ====================================	56-146
	Toluene	01 1	ON 1	10.7	1 107	1 9.72	1 97	10	14	112-150
	Chlorobenzene	10	<u>S</u>	10.1	101	9.37	76	7	36	16-133
Relative Perc	Relative Percent Difference (PR) = MS - MSD	MSD x 100	0			kariterarên de de sanakê de sanakê de sanakê de sanakê de sanakê de sanakê de sanakê de sanakê de sanakê de sa	- The state of the		-	on comment designations designations and the second second second second second second second second second se

(MS + MSD)/2

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result SA = Spike Added (Concentration) - SR x 100 Percent Recovery (PR) =(MS or MSD)

Not Calculated Not Detected NA = NC = ND =

Not Applicable

88-A1-DULU0149 1

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY WATER

OROO1

QC Report No.:

OCP-W-0034-88 88092306

Client:

· STATE OF THE PROPERTY OF THE

ES Oak Ridge

Level (Low/Med): Low

Attn: Address: Bill Hayden 710 S. Illinois Avenue

Suite F-103

37830

Oak Ridge, Tn.

Date Reported:

OC Sample No.:

11-11-88

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Au Burton

QC Report for Laboratory Sample No(s).:

88092303-88092306, 88092291-88092293

88092423-88092427, 88092313-88092317

88092323-88092327

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/L)	MS Conc. In Extract (ug/L)	MS % Rec. #	QC Limits Rec.
Lindane	200	ND	ND	NC*	56-123
Heptachlor epoxide	200	ND	0.200	100	40-131
Aldrin	200	ND	0.226	113	40-120
Dieldrin	500	ND	0.577	115	52-126
Endrin	500	ND	0.516	103	56-121
4,47-DDT	500	ND	0.392	78	38-127

	MSD Conc.	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	MS %	%	QC Lin	nits
	In Extract (ug/L)	MSD % Rec. #	Rec. #	RPD #	RPD	REC
Lindane	ND	NC*	NC*	NC*	15	56-123
Heptachlor epoxide	0.191	96	100	5	20	40-131
Aldrin	0.187	94	113	19	22	40-120
Dieldrin	0.478	96	115	19*	18	52-126
Endrin	0.465	93	103	10	21	56-121
4,4'-DDT	0.317	63	78	20	27	38-127

^{# -} Column to be used to flag recovery and RPD values with an asterisk

NC - Not Calculated

RPD: 2 out of 6 outside limits

2091

Spike Recovery: 2 out of 12 outside limits

^{* -} Values outside of QC limits

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY WATER

Job No:

OR001

QC Report No.:

OCP-W-0034-88B

Client:

ES Oak Ridge

QC Sample No.: Level (Low/Med): Low

Blank

Attn:

Bill Hayden

Date Reported:

11-11-88

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

MiButton

Project:

Laboratory Supervisor Approval:

Duluth ANGB

QC Report for Laboratory Sample No(s).:

88092303-88092306, 88092291-88092293

88092313-88092317, 88092323-88092324

88092327, 88092425 88092427

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/L)	MS Conc. In Extract (ug/L)	MS % Rec. #	QC Limits Rec.
Lindane	200	ND	0.177	89	56-123
Heptachlor epoxide	200	ND	0.194	97	40-131
Aldrin	200	ND	0.181	91	40-120
Dieldrin	500	ND	0.487	97	52-126
Endrin	500	ND	0.458	92	56-121
4,47-DDT	500	ИD	0.388	78	38-127

	MSD Conc. In Extract	MSD %	MS %	%	QC Lin	nits
	(ug/L)	Rec. #	Rec. #	RPD #	RPD	REC
Lindane	0.0110	6*	89	179*	15	56-123
Heptachlor epoxide	0.0141	7*	97	180*	20	40-131
Aldrin	ND	NC*	91	NC*	22	40-120
Dieldrin	0.0333	7*	97	177*	18	52-126
Endrin	0.0322	6*	92	176*	21	56-121
4,4'-DDT	0.0279	6*	78	171*	27	38-127

[#] - Column to be used to flag recovery and RPD values with an asterisk

NC - Not Calculated

RPD: 6 out of 6 outside limits

2092

Spike Recovery: 6 out of 12 outside limits

^{* -} Values outside of QC limits

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: OCP-W-0034-88
QC REPORT NO.: OCP-W-0034-88B

Analysis of matrix spikes showed lindane to be not quantifiable because it was swamped by an interference. The RPD for dieldrin was slightly higher than EPA QC guidelines. When spiked blanks were analyzed, an interference made the aldrin response not quantifiable. In addition, the blank spike recoveries were essentially twice what they should have been, while recoveries from the duplicate were close to zero. This suggests that the blank spike was spiked twice and the duplicate not at all. However, when the data associated with these analyses were closely examined, no analytical errors were found.

Heptachlor epoxide was inadvertently used instead of heptachlor in the matrix spiking solution.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

5083

Interestation in a

HARRICAN CONTROL CONTROL CONTROL CONTROL CONTROL CONTROL

- The Control of the

OR001 Job No: Client: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Jillnois Avenue
Suite 7-103
Oak Ridge, Tn. 37830

Duluth ANGB

Project:

Sample Matrix: Conc. Unit: Date Reported:

Water ug/L 10-28-88

Laboratory Supervisor Approval:

11			
Inclusive Sample Nos.	88092312-88092317		
CRDL	0.25		ang San padaga
Conc	##.0 9.#		
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform		·
CAS	75-09-2 67-66-3	THE REPORT OF THE PARTY OF	
Instru- ment ID	 Carbopack 75-09-2 67-66-3		
Fraction	D ACC		
Date Analyzed	9-10-88		
File ID	20	2094	

Job No.:

ORO01

Lab Name:

Engineering Science

Lab Sample No.:

Blank

Client:

ES Oak Ridge

Attn:

Bill Hayden

Matrix: Level (low/med): Water Low

Address:

710 S. Illinois Avenue Suite F-103

Extraction:

37830 Oak Ridge, Tn.

(SepF/Cont/Sonc): Sonc Date Reported:

11-11-88

Project:

Duluth ANGB

Date Extracted:

9-15-88

Date Analyzed (1): 10-15-88

Time Analyzed (1): 14:15

Instrument ID (1): HP5890 #2

Date Analyzed (2): 10-19-88 Time Analyzed (2): 20:14 Instrument ID (2): HP5880

GG Column ID (1): OV-1

GC Column ID (2): Mixed

This Method Blank applies to the following samples, MS and MSD.

EPA Sample No.	Lab Sample ID (1)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2
- - - - - -	88092313 88092314 88092315 88092316 88092317 88092323 88092324 88092327	10-15-38 10-15-88 10-15-88 10-15-88 10-15-88 10-15-88 10-15-88 10-15-88	88092313 88092324 88092327	10-19-88 10-19-88 10-19-88

ENVIRONMENTAL QUALITY PARAMETERS QUALITY CONTROL RESULTS SUMMARY PETROLEUM HYDROCARBONS

.

THE REPORT OF THE PROPERTY OF

Job No.:	AR001	QC Report No:	TPH-W-0072-88
		Sample Matrix:	Water
Client:	ne tok Ridge	Conc. Unit:	mg/L
Attn:	Bill Hayden	Date Received:	NA
Address:	710 S. Illinois Avenue	Date Prepared:	9-23-88
	Suite F-103	Date Analyzed:	9-26-88
	Oak Ridge, In. 37830	Date Reported:	11-01-88
		Dilution Factor:	NA
Project:	Duluth ANGB		•

Laboratory Supervisor Approval:

88092291-88092293, 88092305-88092306 88092314-88092317, 88092312, 88092321, 88092354, 88092324, 88092349, 88092388-88092390 QC Report for Laboratory Sample No(s):

Project:

	Notes	
	RPD	
	PR	
	MSD	
	MS PR	
	SA M	
	SR	
and the state of t	Blank	
	Anal Me thod	
	Laboratory Sample No.	

95 37.5 97 38.5 39.5 <1.5 <1.5 **Blank** 2096

Ţ
Ψ.
ᆮ
(U
Ž.
+
Œ
a
5
.5
Τ.
ب
Œ
نز
4
æ
-
~
* See Case Narrative attached.
a)
U)
æ
CŠ
_
41
Ψ
a)
S
-k

MS = Spike Sample	SR = Sample Result
MSD = Spike Duplicate	SA = Spike Added (Con
Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2}$ X 100	Percent Recovery (PR) = $\frac{SSR - SR}{SA} \times 100$

SA = Spike Added (Concentration) tesult

CASE NARRATIVE QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: TPH-W-0072-88

Insufficient sample was available for quality control purposes. The laboratory control sample is designated as a quality control sample for this batch.

The reporting limit for the samples in this batch is provided by the sub-contract laboratory.

2097

The state of the s

50.d Check' 9/16/58 SAMULE 88092391, 2314,2315,231 2321,25573, 2322,2303,23c. 2306, 2312, 2313, 2316

VOLATILE CONTINUING CALIBRATION CHECK

LabName:		C c	ontract:_		· Florid Ste co*
Lab Code: Case N	No.:		SAS No.	:	SDG No.:
Instrument ID .: CARbopak	_ Calibr	ration [)ate(s):_	9/16/89	
LAB FILE ID: <u>47,48</u>	Init.	Calib.	Date(s)	1: 9/13/80	9/14/89
	/				
	<u> </u>				
COMPOUND	RRF	RRF50	%D		
Benzyl chloride	0.32	0.3/	3		
bis (2-chloroethoxy					
methane	_			}	
bis (2-chloroisopropyl		·		_	
ether		:		-	
Bromobenzene	1.0	· /·/	10		
Bromodichloromethane	3.5	4.0	14	1	
Bromoform	1,7	2,0	18		
	0-20		30	•	
Carbon tetrachloride			13	1	
Chloroacetaldehyde					
Chlorobenzene	1,2	1.5	25		
Chloroethane	0.45	0.46			
Chloroform	4,2	4,7	12		
		0.87	0.		
2-Chloroethyl vinyl ether_		· —	~		
	0.79	0.86	9		
Chloromethyl methyl ether_		!		, [
o_,m_,& p_Chlorotoluenes _		3.6	3	· •	
Dibromochloromethane	3.4	4.0	18	· !	•
Dibromomethane		2.3	4	!	•
1,2_Dichlorobenzene	2.2	2.7	23	' !	
1,3_Dichlorobenzene		2.4	26	' !	
1,4_Dichlorobenzene		7.3	37	, !	
Dichlorodifluormethane		<u>'</u>	' 	, !	
	2.3	24		• •	
1,2_Dichloroethane	2,6	20	12	• •	
1,1_Dichloroethylene	76	1 /	0	, !	
trans_1,2_dichloroethylene	24	7.62	Ö	!	
Dichloromethane	3,5	3,7		! !	
1,2_Dichloropropane	2,3	2.5	7	ı İ	
1,3_Dichloropropylene	4.5	4.4	11	i į	
1,1,2,2_Tetrachloroethane_	1	7.7	18	1 •	
	! <u>- PIS</u> !	34	- <i>L9</i>	1 (
1,1,1,2_Tetrachloroethane_	7.5	2.7	10	: {	
Tetrachloroethylene	2.9	3,2	10	! !	
1,1,1_Trichloroethane	4,5	 	2	: (
1,1,2_Trichloroethane	3,9	\ \		•	
Trichloroethylene	2.4	1-4/2		! !	
Trichlorofluormethane	7.0	\ \	10	; ;	
Trichloropropane	0.99	1.0	20	! !	
Vinyl chloride		1		1	

50d Clack 9/16/88 5Amyle#88092341,23,14, 2315,2317,2321,2322,2363, 2305,2306,2312,2313,2316

VOLATILE CONTINUING CALIBRATION CHECK

LabName:		Co	ntract:	The same of the sa
			SDG No.:	
Instrument ID.: <u>CAR</u>	boook calib	ration D	ate(s): 4/1	6/89
LAB FILE ID: 47	Init.	Calib.	Date(s): 9/13	3/89
		 		
COMPCUND	•	RRF50		
Be ane	1.6	4,8		
Chlorobenzene	4.7	4.6	<u> </u>	
1,Z_Dichlorobenzene	3.7	3,6	<u> </u>	
1,3_Dichlorobenzene	! <u>-4.3</u> _	7.0	l	
1,4_Dichorobenzene_	<u> 3,3</u> _	133		
Ethyl Bezene	<u> </u>	7.0		
Toluene	<u> </u>	7.2	· i	
Xylenes			i	

This page intentionally left blank.

DATA PACKAGE #35

This page intentionally left blank.

Job No.: OROO1

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the soil samples received by this laboratory on 8-31-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092215	DANGB,2BH1,SS1,0-2'	MOIS	8-30-88		9-13-88	
88092215	DANGB,2BH1,SS1,0-2'	8010	8-30-88		9-08-88	9-09-88
88092215	DANGB,2BH1,SS1,0-2'	8020	8-30-88		9-08-88	9-09-88
88092216	DANGB,2BH1,SS2,2-4'	MOIS	8-30-88		9-13-88	
88092216	DANGB,2BH1,SS2,2-4'	8010	8-30-88		9-08-88	9-09-88
88092216	DANGB,2BH1,SS2,2-4'	8020	8-30-88		9-08-88	9-10-88
88092217	DANGB,2BH1,SS4,8-10'	MOIS	8-30-88		9-13-88	
88092217	DANGB,2BH1,SS4,8-10'	8010	8-30-88		9-09-88	9-09-88
88092217	DANGB,2BH1,SS4,8-10'	8020	8-30-88		9-09-88	9-10-88
88092218	DANGB,2BH1,SS3,6-8'	MOIS	8-30-88		9-13-88	
88092218	DANGB,2BH1,SS3,6-8'	8010	8-30-88		9-09-88	9-09-88
88092218	DANGB,2BH1,SS3,6-8'	8020	8-30-88		9-09-88	9-10-88
88092219	DANGB,2BH1,SS5,10-12'	MOIS	8-30-88		9-13-88	
88092219	DANGB, 2BH1, SS5, 10-12'	8010	8-30-88		9-09-88	9-10-88
88092219	DANGB,2BH1,SS5,10-12'	8020	8-30-88		9-09-88	9-10-88
88092220	DANGB,2BH2,SS1,0-2'	MOIS	8-30-88		9-13-88	
88092220	DANGB,2BH2,SS1,0-2'	8010	8-30-88		9-09-88	9-10-88
88092220	DANGB, 2BH2, SS1, 0-2'	8020	8-30-88		9-09-88	9-11-88
88092221	DANGB, 2BH2, SS2, 5-6'	MOIS	8-30-88		9-13-88	
88092221	DANGB, 2BH2, SS2, 5-6'	8010	8-30-88		9-09-88	9-09-88
88092221	DANGB, 2BH2, SS2, 5-6'	8020	8-30-88		9-09-88	9-11-88
88092222	DANGB,2BH2,SS3,10-12'	MOIS	8-30-88		9-13-88	
88092222	DANGB, 2BH2, SS3, 10-12'	8010	8-30-88		9-09-88	9-09-88
88092222	DANGB,2BH2,SS3,10-12'	8020	8-30-88		9-09-88	9-11-88

* If applicable

88-A1-DULU0137 1

A SUBSIDIARY OF THE PARSONS CORPORATION

CL-FRM01

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S):: 88092215-88092222

These soil samples were received at the ES Berkeley Laboratory on 8-31-88. They were received cold and intact.

THE STREET SETTINGS IN 18.75

(a) ()

च्छाच्या स्ट्रांच इटरहरूर

TAGE MUMBER: CZ.
TOE MUMBER: 1 7PO(000090400
20P1 DEFOEP DATE : GP/G1/62

MAREPOST DATA:

The state of the s

TOTAL PROFESSION AND 710 S | ILLIMOIS BUE, STE, S103 #700 RIDGE, TN | 57830

\$70A- RIGGE, TN 57930 #FILL HAYDEN

CLIENT DATE:

ES DAY FIDGE DILLETH ANGE 1 134. 716 5 ILLINOIS AVE STE S105

DAY FIGUE, THE STREET

Aum it ababel Chalest !

TOUTHAIT PR + : OFF IT

A ETCH HALLEN

-1-1--31-=371

TASE 1 3 LATTER HA

AP 468,2841,531, 04M68.0641.582, 04%28,38H1.584. DANGB,28H1.58%. BANGB.18H1 88%. DANGB.28H2.581. 9-1 2-47 8-107 6-8 10-12 H-2 35092215 89092016 98092217 98092718 88092217 88092700 TEST COMERRY i i kalistiki

MB - Hot (==ecres

2105

MALYSIS SEPÕRT FOR WORK ÖFTER HUMFER

RŠKO JĀ, UNĪTSO NĀ

08498.3842,552, 0ANGB.3542,963.

5-3

EST COMPOUND

10-12; 8309022;

886c52271

MÖISTURE

11.0

PROTOCERS AS TENUE THE

Ataq (973 488647

TWOPK ORDER NUMBEF: 536 TOB PUMBEP : ZEGOGGAGGAAA WORK ERDER DATE : 03/01/68

APPROJED : all Burker

PAGE

REPORT DATA:

ES DAY RIDSE/DULETH ANSE

TIO S ILLINGIS AND STE 3,93

TOAY RIDGE, TN 37773

ESTAL MAYDEN

CLIENT DATA: ES GHE FIDEF-EQUNTH ANCE - 154: 710 F FELINGIS NUE STE 5103 DAY FIDGE, TN 57870

at a be seeden cuelca: I

The state of the s

. 1931: W. (NITS) (g. 19. GP905 Proje

TEST COMPOUND	0ANGE.2841.5.1 U-D 86192015	04M38.28H1.652. 0-4 86092216	04MGB.20H1.554. 6-10 18092217	JANGE, 2841, 853, 4-87 88090018	DAHGB.2881.535. 10-11 88452215	[9NGB.28+2.848. 6-2 8-99223]
Parameter Control of the Control of						
* TEENTYL CHLORIDE	พัญ	4.3	#[M	v <u>î</u>	N <u>ē</u>
EIS (2-CHLOPOETHOX) METHANE	55	NI	H	KŢ	R[<u>\f</u>
EIS 'Z-CHLOSCISOPFOR'L NETHER	NC.	ભું	яŬ	KĐ	(4)	10°
I FROMOBEKTEKE	МĎ	F 3	PE:	NJ.	1;7	#0
EROMODICALGROMETHAME	ųį	ी-1 -	ND	Ni)	KIF	N()
₹ EPEMOFORM	٠į	#Ţ	Б Б	k[/	15	NT.
ER ONDETHAKE	45	N	45	45	1,2	- 5
* CARSON TETRACHUERICE	t, 5	f. *	k <u>r</u>	1.*	N.	₹ Ş
, IHLBRACETALEEHYDE	81	×0	r	ΝÇ	r¥f)	•,•
CHEOFAL	, *	.*	ΝĮ) **	4 . 7	119
Indiposerzene	f 💆	,હીં	N.	R;	1.3	Şî
OH GREETHANE	ŧ.,	•	#:	M1	k <u>"</u>	H.
} (+_069=6=M	N.	•	ବ୍ୟ	; 75	6 57	7 £
# -C5E080+8 648	·*	; *	·í	ı.Ţ	r f	4D
CHOMEDRAETAY, MINNE ETHER	·1 ·	ভূ	βĘ	٩Ū	(a)	14
# - CHUGA OMETHANS	k.*,	· 1	ĦĹ	11	.[K.
를 "	មេប៊ិ	r. *,	47	• <u>0</u>	40)· *
# 10-LOPETELHENE	ħē.	kţ,	ŧ₿	ąę.	-;·	40
TIEROMACHLOROMETHANE	4.j	t•Q	NE	is0	NE	kî
101599MONETARKE	NG.	NE.	K 5	No	ų,	ł:
∰	n!	••	7.0	° nri	3-	-4'
1.5-61646664E WIENE	5.1	Mp.	۴ [RO	Nf.	· [·
畫71.4-610-L0F36EM7FNF	t. ,	NF.	14[f ₅ [:	ga ga	NO
量:{ cftffbbbbcnbrakfmnkf	Þе	11	1 -15	,∉[15.	in the second
1-10HT0E0E19946	ŧū	RQ	% 5	<u>K</u>	មន្តិ	H ₂ 5
T-010HL9F0ETHANE	15	សព្	ĸ*	elf.	·-{·	; -
TO CONTRACT THE SET OF SETTING THE	te*:	শ §	45	į.	?	N.
量_ magera = 5.02+000cm, genetakatib. E	<i>(</i> -)	e_{θ}^{2}	:-	4	• 🖫	: •
1008FA16KELP5PE	5 II	·	: 13	18	ે રદ્	1 65
TO CHARGO PARTY AND THE STATE OF THE STATE O	45	Ht	R_{V}^{\bullet}	g_{χ}^{*}	`	f• _

** - This compound is possibly present but it was not confirmed on the second column. The sample was non-homogeneous and was the ficult to subsample accurately..

15 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10 - FE | 10

ANALYSIS REPORT FOR WORK OFFER HOMBER - 935

	DANGE.28F1.551. 9-1:	[AKAB.2BH1.892. ≦-4	PANGE.2FH1,854.	DANGB.78H1.88%.	DENGR.JEH1.59%.	64868, TBB* .1E1.
TET COMPOUND	98665518	8E 0º1216	83077217	88090513	88022719	88640106
R-DICHLOROPPIDE LENE	44	III	ND	k ()	N()	M
.1.1.1-TETRACPLORGETHANE	Mi	NÐ	\tilde{q}_{1}	40	N;	hú
1.3.2-TETRACHLOSDETHANF	MP	40	M	K§	sq	KE
TTFACHLOROETHILEND	£ ?	Nß	ii =	1 0	3 B	7.890
34CHT39R0JH31RT-1,	* }	N S	ν _{įt}	In[i	H[• [
.1.2-TRICHLOROETHSHE	កម្វិ	E_{\perp}^{\dagger}	tų į	10	۸ŗ	и́0
-J041646441F6	1 0	۽ َ ڊ	<i>:</i>	ιĖ	٠.	61.7
34,4473 mg 95643465	ĦĒ	្រព្	Ni	n[. ₿	1.7
.TH_356TP6PA.E	\	Kie	35	r.D	v 2	NE
NY, THISETER	NĎ	. =* 19	hi.	N D	1.7	អត់

HAMAN SES BELOPPI EU. MURY GRYER HOWER ... 627

TASK: 4, 08175: 03 Fc. 61005 8010

-deliniphelikes	-TEST (OMFQUN)	9AMG8.26H2.552. 5-A 86391321	DAMSP.,RH2 55- 14-17 880-2007
Sedhimpera	BENZYL CHLARITE BIS /Z-CHLORGETHI//I/PETHANE	H0 N0	MŪ MĮ
Sinitich serie	EIR (2-18EGARTSTERGEN) ETHER PROMOSENTENE PROMOSENTERFREMETHANS	№° я4 я5	HT No.
As Les	CARBON TETRICHLORISE	89 45	45 47 47
robstrust-fallungs	CHIGHACETH (BEH) DE CRICEAL	KE HE	N2 N7
e-modelmententage e	TEVOROBENZERS CHLORGETHANR 4. CROEORM	#0 #0 #3	N(5 334
Park water could be a	ISHCHLOROHEXANE ISHCHLOROETHY, LININ ETHER ISHOROTETHHYE	N° N° NÇ	19 N N
	CHLOROTOLUENE CHLOROTOLUENE CIERONOCHLOROMETHANE	1.0 ND NO	#3 전 *1
;	ECER MOMETHANE CLC-DECHLORDERNZENE CLB-EECHLERDEENZENE	<i>พ</i> ฐ พ§	45 46 30
	0.4-000HL0F0SEHZENF TBCHL0F00FL69P6METHAMF CLOHTCHLGF0ETMAKE	V	นกุ้ พ.
ı	0.0-0.00000000000000000000000000000000	् हे १ <u>१</u>	#D
}	0.01-186476-0-0-0-186 0.01-1864624-46	15 <u>9</u> 169	.51 -4 -4 14
no describe or	UTKBOOKUNSOFFRERKYENE OWULOUTTETRATHUDRAETHAKE OKSUK OHTETRACHURSETHAKE	46 - 17 36)	หรู หรู พร
And Albertage States	TETRALHICAGATH NEWS LLOUE-TROCHLOR ZETHANG LLOUE-TROCHNORDETHANG	156 46 80	n
Abragation strategic	TRICHECERE GROMETHANA TRICHECERE GROMETHANA TRICHECERE	 	124 61 49
144	EIN C INTORTIE	κÇ	HĘ.

ENAL 1975 FEFORT

THE ORDER HUMBER: 13c

75 NUMBER : 38 % 0.0000 440 (1 090ER DATE : 09 01/88 APPROVED SA

lat Singrifico

POFT DATA:

1 CAR RIDGE/DULUTH ANGB A 5 ILLIHOIS AVE STE 51/3

· PIDGE, TH 37636

TIL -AYDEN

CLIENT DATA:

ES MAN FIBLE DULHTH ANGE (134) 710 S. ILLIMOIT AVE. STE. SIOT

OA: FIDCE, TN 37630

IF PETOFF CHFIESE .

10139 : # 19 TOP 2701

THIRD FROM BRIDER

1015 401-3021

34 - MITER OF LEFELF PAGE

IST IOMPOUND	0+MGE.7EH1.351. 3-2 880°2715	14NGB.28#1.952. 2-4 88992215	5-11	044GB.2841,335, 6-6' 83092218	TAMBE, 2841,555, 10-121 88092319	04408.2340.531. 6-11 88690000
147ENE	2501	1519	7:00	140(1990	1700
-LIFGEERCERE	4	8 5	ΝE	*[HC	***
.P-010AL0ACSENZEHE	•	64	•	•	,	•
.F-GICHLOPOBENZENE	KS.	10	N'	Hi:	ist .	HP
DICALORGEENZENS	×9	+D	k.	ng	n)	ស្មី
THRE PERCENE	-409	a: 50	724 . ·	[4866	24(6	F706
TONE	200 :	5408	1765	15000	107	-o0 ∵
.EMES	in H	1390.5	27, 66	71.793	869.	18:50

- 1,2 Dichlorobenzene was present by 8010 analysis but not quantifiable by 8020 due to fuel hydrocarbon interferences.
- - Surrogate recovery high due to matrix interferences Sample 88092218.
- Chlorobenzene is present by 8010 analysis but is not quantitable by 8020 or confirmed due to fuel hydrocarbon interferences.

2110

HARLYSIS REFORT FOR WORK PROCE MOMETR - 836

TASE: 4, UNITS: 03/13, GPOUR 9610

	TEST COMPOUND	09NGP,2BH2,5S2, 5-6 68090001	PAMIR, 78+2,597, 10+101 886,92020
4004	BENZENF	1700	1100
是 是 是 是 是 是 是 是 是 是 是 是 是 是	BENZENF CHLOROBENZENE	N9	Ħ
	1.2-DICHLOPGBEHZENE	•	23
7	1.3-0104LOPORENTENE 1.4-0104LOPORENTENE	NI	N.
	1.4-DICHLOPERENTENE	#F)-ji
3.	ETH-L SENSEME	15960	£ 1 \$.
***	TOLICHE	7.00	;
	NY_ENES	17349	2066

hi - het Beresse-

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

OR001 Job No.:

VGC-S-0043-88

710 S. Illinois Avenue ES Oak Ridge Bill Hayden Address: Client:

Attn:

Suite F-103

37830 Oak Ridge, In. Laboratory Supervisor Approval:

10-19-88

Dilution Factor:

Moisture:

9-13-88

9-01-88

Date Received: Date Prepared: Date Analyzed: Date Reported:

Conc. Unit:

ug/KG Soil

Sample Matrix:

QC Report No:

QC Report for Laboratory Sample No(s).: 88082203

Duluth ANGB

Project:

88082215-88082227

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	ES RPD	QC Limits Recovery
	Halocarbons: 8010				~~ ~				~~ ~-	
88082227	1,1-dichloroethane	10.9	2	0.6	83	80 =	81	N +	20	58-124
	Trichloroethene Chlorobenzene	10.9 10.9	O ON	6.8	62*	6.8	62*	- 0	21	71-125
2	Aromatics: 8020				A		~~~			
88082227	Benzene	10.9	S S	7.1	65*	7.2	*99	n	156	75-123
2	Toluene Chlorobenzene	10.9	N. O.	7.1	65*	7.2	*99	o	75	82-112

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

See Case Narrative attached.

(MS + MSD)/2 MS - MSD Relative Percent Difference (PR) = __

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result SA = Spike Added (Concentration)

11

Not Calculated Not Detected ** N N

Not Applicable

11

88-A1-DULU0135 1

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

· melberthouse

OR001 Job No.:

ES Oak Ridge Client:

710 S. Illinois Avenue Bill Hayden Address: Attn:

Suite F-103

37830 Oak Ridge, In.

Duluth ANGB Project: QC Report for Laboratory Sample No(s).: 88082203

88082215-88082227

10-19-88 9-13-88 ug/KG NA Soil Dilution Factor: Sample Matrix: Date Prepared: Date Reported: Date Received: Date Analyzed: % Moisture: Conc. Unit:

VGC-S-0043-88B

QC Report No:

Laboratory Supervisor Approval:

Laboratory Sample No.	Compound	SA	SR	Σ. S.	PR	MSD	PR	RPD	ES RPD	QC Limits #Recovery	
	Halocarbons: 8010	www 201					~~ ~	***	~~ ~~		
Blank	1,1-dichloroethane	10	<u>8</u>	10.3	103	10.6	106	m (50	58-12 ⁴	
	Irichloroethene Chlorobenzene	0 0	ON ON	10.1	101	10.0	103	2 2	21	71–125	
21	Aromatics: 8020				~~ ~				**		
Blank 1	Benzene Toluene	0 2	25	10.3	103	10.5	105	~	1 26 1 16	75-123	
		2 0	<u> 2</u>	10.7	107	10.4	104	· m	77.	82-112	
MOTO TO STATE										***************************************	ı

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

See Case Narrative attached

x 100 (MS + MSD)/2 MS - MSD Relative Percent Difference (PR) =

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result SA = Spike Added (Concentration)

Not Applicable Not Calculated 11 H NA NC ND

Not Detected

QC-FRM3S

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: VGC-S-0043-88
QC REPORT NO.: VGC-S-0043-88B

Recoveries of SW8010 and SW8020 matrix spike compounds were generally low. This is probably due to masking by the fuel hydrocarbons present in the sample. Analysis of spiked blanks shows the laboratory to be in control.

METHOD BLANK SUMMARY

handred is

OR001 Jeb No: Client: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, Tn. 37830

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/KG 10-19-88

Laboratory Supervisor Approval:

Duluth ANGB Project:

	**************************************			need they acce done poed near predict
Inclusive Sample Nos.	88082215-88082216	88082217-88082222 88082223-88082225	88082226-880822 <i>27</i>	
CRDL	0.25	0.25	0.25	where he was shown the we come whether
Conc	8.0	5.8	4 0 5 5	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform Toluene	Dichloromethane Chloroform	Dichloromethane Chloroform	
CAS Number	57-09-2 67-66-3 108-88-3	75-09-2 67-66-3	75-09-2 67-66-3	~~ ~~ ~~ ~~ ~~ ~~
Instru-	 Carbopack 57-09-2 67-66-3 108-88-3	 Carbopack 75-09-2 67-66-3	Carbopack 75-09-2 67-66-3	
Fraction	AGC	NGC .	NGC	
Date Analyzed	9-08-88	9-08-88	9-10-88	
File ID	≅ 7	35	& 37	2115

This page intentionally left blank.

DATA PACKAGE #36

This page intentionally left blank.

Job No.: OROO1

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the water samples received by this laboratory on 9-14-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092388	DANGB-4-GW4A-GW1	BA-I	9-13-88		10-19-88	-/
88092388	DANGB-4-GW4A-GW1	CD-F	9-13-88		10-24-88	
88092388	DANGB-4-GW4A-GW1	CR-F	9-13-88		11-07-88	
88092388	DANGB-4-GW4A-GW1	PB-F	9-13-88		10-25-88	
88092388	DANGB-4-GW4A-GW1	418.1	9-13-88	9-23-88	9-26-88	
88092388	DANGB-4-GW4A-GW1	8010	9-13-88		9-16-88	9-19-88
88092388	DANGB-4-GW4A-GW1	8020	9-13-88		9-16-88	
88092389	DANGB-4-GW4D-GW1	BA-I	9-13-88		10-19-38	
88092389	DANGB-4-CW4D-GW1	CD-F	9-13-38		10-24-88	
88092389	DANGB-4-GW4D-GW1	CR-F	9-13-88		11-07-88	
88092389	DANGB-4-GW4D-GW1	PB-F	9-13-88		10-25-88	
88092389	DANGB-4-GW4D-GW1	418.1	9-13-88	9-23-88	9-26-88	
88092389	DANGB-4-GV4D-GV1	8010	9-13-88		9-16-88	9-19-88
88092389	DANGB-4-GV4D-GV1	8020	9-13-88		9-16-88	
88092390	DANGB-4-MW8-GW1	BA-I	9-13-88		10-19-88	
88092390	DANGB-4-MW8-GW1	CD-F	9-13-88		10-24-88	
88092390	DANGB-4-MW8-GW1	CR-F	9-13-88		11-07-88	
88092390	DANGB-4-MW8-GW1	PB-F	9-13-88		10-25-88	
88092390	DANGB-4-MW8-GW1	418.1	9-13-88	9-23-88	9-26-88	
88092390	DANGB-4-MW8-GW1	8019	9-13-88	, 10 00	9-16-88	9-19-88
88092390	DANGB-4-MV8-GV1	8020	9-13-88		9-16-88	, 1, 00
88092391	DANGB-TB6	8010	9-13-88		9-20-88	9-16-83
88092391	DANGB-TB6	8020	9-13-88		9-20-88	, 10 00

* If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88092388-88092391
WORK ORDER NO.: 979

These water samples were received at the ES Berkeley Laboratory on 9-14-88. They were received cold and intact.

ANALYSIS REPORT

MORK ORDER NUMBER:

108 NUMBER : ZB0000000440

WORK ORDER DATE : 09/14/88

EPORT DATA:

S OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

AK RIDGE, TH 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

.ONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

and ASK: 2, UNITS: mg/L

GEST COMPOU	ND	DANGB-4-GW4A- GW-1 88092388	DANGB-4-GW4D- GW-1 88092389	DANGB-4-MW8- GW-1 88092390
₹ \CID DIG FL	AME	NA	NA	NA
CID DIG FL CID DIG FU	RNACE	NA	NA	NA
BARIUM		0.17B	0.17B	<0.05
CADMIUM		<0.001	<0.001	<0.001
:HROMIUM		0.0039 SB	0.0028B	<0.002 W
HROMIUM EAD		<0.005	<0.005	<0.005

NA - Not Analyzed ND - Not Detected

ENGINEERING-SCIENCE INC. 11/14/88

PAGE 2

ANALYSIS REPORT

ORK ORDER NUMBER:

979

: ZB0000000440

RK ORDER DATE : 09/14/88

PORT DATA:

)B NUMBER

3 OAK RIDGE/DULUTH ANGB

10 S. ILLINOIS AVE. STE. S103

\K RIDGE, TN 37830

!LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / FJ # : OROO1

ONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 3, UNITS: mg/Kg

DANGB-4-GW4A-

DANGB-4-GW4D-

DANGE-4-MUS-

EST COMPOUND

GW-1 88092388

GW-1 88092389

GW-1 88092390

18.1 PETROLEUM HYDROCARBONS

3.24

<1.5

<1.5

) - Not Detected

PAGE 3

ANALYSIS REPORT

ORK ORDER HUMBER: 979
OB NUMBER: 2800000

: 280000000440 WORK ORDER DATE : 09/14/88

EPORT DATA:

一般のできる。 こうから こうかんしゅうしゅう

S OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

gOAK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO # : ORO01

CONTACT

: BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/L, GROUP 8010

• Automorphie	DANGB-4-GW4A- GW-1	DANGB-4-GW4D- GW-1	DANGB-4-MW8- GV-1	DANGB-TB6
E-EST COMPOUND	88092388	88092389	88092390	88092391
FENZYL CHLORIDE	ND	ND	ND	ND
IS (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND
BIS (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND
BROMOBENZENE	ND	ND	ND	ND
ROMODICHLOROMETHANE	ND	ND	ND	ND
ROMOFORM	ND	ND	ND	ND
BROMOETHANE	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND
HLORACETALDEHYDE	ND	ND	ND	ND
HLORAL	ND	ND	ND	ND
CHLOROBENZENE	ND .	ND	ND	ND
; CHLOROETHANE	ND	ND '	ND	ND
HLOROFORM	ND	ND	ND	ND
1-CHLOROHEXANE	ND	ND	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND	ND	OK
- HLOROMETHANE	ND	ND	ND	ND
HLOROMETHYL METHYL ETHER	ND	ND	ND	ND
CHLOROTOLUENE	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	ND	ND	ND
: I BRONOMETHANE	ND	ND	ND	ND
.2-DICHLOROBENZENE	ND	ND	ND	ND
1,3 DICHLOROBENZENE	ND	ND	ND	ND
g 3,4-DICHLOROBENZENE	ND	ND	ND	ND
I CHLOROD I FLUOROMETHANE	ND	ND	ND	ND
🗓 , 1-DICHLOROETHANE	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND
₹7,1-DICHLOROETHYLENE	ND	ND	ND	ND
RANS-1,2-DICHLOROETHYLENE	NĐ	ND	ND	ND
DICHLOROMETHANE	0.31B	0.498	0.67B	0.698
1,2-DICHLOROPROPANE	MD	ND	ND	ND

ND - Not Detected

2123

ANALYSIS REPORT FOR WORK ORDER NUMBER 979

	DANGB-4-GW4A- GW-1	DANGB-4-GW4D- GW-1	DANG8-4-MU8- GW-1	DANGS-TB6
ST COMPOUND	88092388	88092389	88092390	88092391
*****************			***********	
3-DICHLOKOPROPYLENE	ND	ND	ND	ND
1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND
1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND
TRACHLOROETHYLENE	ND	ND	ND	ND
1,1-TRICHLOROETHANE	HD	ND	ND	ND
1,2-TRICHLOROETHANE	ND	ND	ND	ND
ICHLOROETHYLENE	ND	ND	ND	ND
ICHLOROFLUOROMETHANE	ND	ND	ND	ND
ICHLOROPROPANE	ND	ND	ND	ND
NYL CHLORIDE	ND	ND	ND	ND

ANALYSIS REPORT

ORK ORDER MIMBER: 979
OR NUMBER: 280000000440

WORK ORDER DATE : 09/14/88

The state of the s

EPORT DATA:
ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

STAK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE DULUTH ANGB (134)

710 S. ILLIPOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

SONTRACT / PO # : OROO1

CONTACT : BILL HAYDEN

(615)-481-3920

ASK: 4, UNITS: ug/L, GROUP 8020

Toutsellings TEST COMPOUND	DANGB-4-GW4A- GW-1 88092388	DANG8-4-GW4D- GW-1 88092389	DANGB-4-MW8- GW-1 88092390	DANGB-TB6 88092391
#":ENZENE	ND	ND	ND	ND
ENZENE :HLOROBENZENE	ND	ND	ND	ND
1,2-DICHLOROSENZENE	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	CM	ND	ND
,4-DICHLOROBENZENE	ND	ND	ND	ND
THYL BENZENE	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND
XYLENES	ND	ND	ND	ND

ND - Not Detected

QUALITY CONTROL RESULTS SUMMARY METALS

Million of the second second second

	Job No.:		OR001 ES Oak Ridge					oc Sai Con	QC Report No: Sample Matrix: Conc. Unit:	No: r (x:	AAF-W Water ug/L	AAF-W-0031-88 Water ug/L	88		
and the same	Address	8111 710 8uft 0ak	Bill Hayden 710 S. Illinois Avenue Suite F-103 Oak Ridge, In. 37830	yenue 37830				04 DA	Date Received: Date Reported: Dilution Factor:	ved: ted: actor:	8-3 11-0 NA	8-31-88 11-07-88 NA			
ng _e projected in a Kanada di Salamanaya Kanada di Salamanaya	Project:	Dulu	Duluth ANGB												
a van en en en en en en en en en en en en en	QC Report	t for Labora 88093 88093	.QC Report for Laboratory Sample No(s): 88092348-88092350, 88092354-8809235	lo(s): , 88092354 , 88092422	(s): 88092354-88092355, 88092422-88092427,	8809231 <i>1</i> 88092189	11	e.l	Laboratory Supervisor Approval:	Superv	tsor Ap	proval:			
	Analyte	Laboratory Duplicates	Sample Nos. Spike	Date Anal	Date Prep	Anal Method	Blank	G 13	Dupl Cate C2	RPD	VS	Spike R SR	Spike Recovery SR SSR	PR	Notes
น้ำให้เห็น ได้ และ เก็ตให้เห็น ได้ และ	Arsenic	88082189	88082189	10-26-88	10-18-88	2060	<0.010	<0.010 <0.005 <0.005	<0.005	316	0.040	<0.005 0.0517		129N	
	Chromium	88082189	88082189	10-26-88	10-18-88	6010	<0.005	<0.005 <0.002 <0.002	<0.000	NC	20.0	<0.002	21.6	108	
v ji	2 pe ad	88082189	88082189	10-25-88	10-18-88	7421	<0.010	<0.010 <0.005 <0.005	<0.00>	NC	0.020	<0.005 0.0227	0.0227	114	
15 4	126														
	N - See L	Legend attached.	hed.						· es stand etterditudens stranslageramm.de e de						
	- '	Percent Dif	Relative Percent Difference (RPD)	$= \frac{c_1 - c_2}{(c_1 + c_2)}$	$\frac{\text{C2}}{2)/2} \times 100$		C1 = Co C2 = Co	Concertration Concentration	= Concentration One = Concentration Two		11A - 11ot 11G - 11ot ND = 11ot		Applfcable Calculated Defected		
	Percent R	Percent Recovery (PR) = SSR -	SA SR - SR x	× 100			SSR = Sp SR = Sa SA = Sp	Spiked Sample Sample Result Spike Added (Spiked Sample Result Sample Result Spike Added (Concentration)	sult :entratj	!		U		

QUALITY CONTROL RESULTS SUMMARY METALS

physinitianapolity

THE STREET

ξ, Se,

April and the second

OR001 Job No.: ES Oak Ridge Client:

710 S. Illinois Avenue Suite F-103 Bill Hayden Address: Attn:

37830 Oak Ridge, In.

ICP-W-0050-88 Sample Matrix: QC Report No:

Water ng/L Conc. Unit:

9-13-88 11-07-88 Date Received: Date Reported:

Dilution Factor:

Duluth ANGB Project: QC Report for Laboratory Sample No(s):

88092348-88092350, 88092354-88092355 88092388-88092390, 88092422-88092427, 88082189

Laboratory Supervisor Approval:

Notes

PR

Spike Recovery

RPD

 $^{\circ}$

5

Duplicate

<

119

2.47

0.089

2.00

Š

0.064

0.089

<0.7

6010

10-20-88 10-18-88

88092348

88092348

Barium

88092348

Cadmium

2127

9/

0.050 <5.001 0.038

SC

Blank	
Anal	Method
Date	Prep
Date	Anal
Sample Nos.	
	Duplicates
Analyte	

<0.005 <0.001 <0.001 6010

A - See Case Narrative attached.

x 100 Relative Percent Difference (RPD) = $\frac{\text{Cl} - \text{CZ}}{(\text{Ci} + \text{C2})/2}$

Percent Recovery (PR) = SSR - SR x 100

C2 = Concentration Two C1 = Concentration One

NA = Not Applicable

NC = Not Calculated ND = Not Detected SSR = Spiked Sample Result

SR = Sample Result SA = Spike Added (Concentration)

CHAIN OF CUSTODY RECORD

L												0.000	-		Γ
	ES JOB NO.		PROJECT NAME/LOCATION	ME/LOCATION ANGR/Dulit	200	NO.		1			25	REQUIRED	RMONH	/ SHIP TO: Engineeming-Science	
		5	סמומנו	Dalati Alask Dalatii, Mii.	11, 10111.			\	<u> </u>	\	(e)	\ \ \?	-	LABORATORY, INC.	
	BAMPLE	EM 8): (8	SAMPLEM S): (Signature)			ŏ	_)•	\				200	60G Baneroft Wey	
	11	1.10.1.	11. 19			CON-	<u> </u>	\ \ !	1.	1	37			Berneley, CA 94/10	
L	DATE	TIME		SAMPLE DESCRIPTION	PTION	TAINERS							,	REMARKS	
تــــــــــــــــــــــــــــــــــــــ	(N.17.8)	1415		DANGS-4-6WAA-6W.	1-000-1	4		1	×	×	-				
	11-7			17145B-4-6W417-6W	1-09-C	4		×	<u>></u>	*					
									_		-				
									-		-				
I									-		-				
<u> </u>									_		 				
				1111					-		-				
<u></u>				11/							-				
<u> </u>			11/11/0		•				-		-				
			1						_						
<u>ب</u>									-		-				
2															
0									_						
<u> </u>	_														
															
1	Milagui	shed by:	Minquished by: (Signature)	0010/Time	Received by: (Signature)	iture) #	Relinquished	P + + + + + + + + + + + + + + + + + + +		Sign	by: (Signature)	Date/Time	Tim•	Received by: (Signature)	
L	Je linqui	shed by	Relinquished by: (Signature)	Date/Time	Received for Laboratory (Signature)	alory by:	Dat	Dete/Time		Nemarks			-	-	
								_	\dashv						

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

E 186 | 168/241.3

10000

F Colonial a

CHAIN OF CUSTODY RECORD

W	ES JOB NO.	0	PROJECT NAME/LOCATION		WATER ANALYSES	YSES
	OR001	001	Duluth ANGB/Duluth, Mn.	0 2	(3)	LABORATORY, INC.
•	AMPLI	EN(8): (8	SAMPLEN(8): (Signature)	ŏ	\ \ \	/
1		12/2	2.180	COM		Berkeley, CA 94710
	DATE	TIME	SAMPLE DESCRIPTION	TAIMERS		REMARKS
	2. 2	0915	DANIE-4- WW8- CW-1	5		
	1 1/21	1100		2		
	1.2.4	7117	DANGE-4-CW4A-CW-1.	5	×	
لِـــ	7	0.0		,		
	7	1: 20	041	7		
لب						
!			•			
ـــــا			. / W.			
21						
96			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			
}		_				
	>					
	//					
E	i) ngui	shed by:	Relinquished by: (Signature) Date/Time Received by: (Signature)	ture)	Relinquished by: (Signature)	Date/Time Received by: (Signature)
	1	Mlul, 2 de.	2 Dec 1-1-1 10 11 11 11 14	1 # 1		
£	13 p. 110	shed by:	Melinquished by: (Signature) (Signature)	itory by:	Date/Time Remarks	·
١						•

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

PALPLEOPHP SACRAGE SACRAGES SA	SENDER'S COPY	To (Recovering Name) Prince Prince (Augustic Prince Number (Augustic Prince Nu	Company Department/Floor No	Exact Street Address (fire Chemic Ballion to P.R. Berns or P.R 21p Codes.)	Cay	CE.) IF NOTA FOR PICK-UP, Print FEDEX Address Nove		WINLEY THE SERVICE COMBITIONS, DECLARED MADE Federal Express Use per year per year.	PHOS CONDINGS	13/4 The state of the the responsible for any clean or excess of \$500 part products, where the read of text, demay, deby or storid-entry, enters you story a higher energy, enters the read of text, demay and the text, pay 40% of the story or story	<u> </u>	The event of unempty sections with the section of the country of t	South multiplication of the state of the sta
AIRBILL MET TOTA AND DELIGIOUS SUPPLIES TO FOURTH CLASS AND AN ONE TO FOURTH CLASS AND AND AN ONE TO FOURTH CLASS AND AND AND AND AND AND AND AND AND AND	1081 4154 A Section 10 A Sectio	You Phone Number (New Importe	Post of the State		State ZIP Required	ATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE)	The Faults Accus tha.	DELIYERY AND SPECIAL MANDLING MICLARES WIN	HOLD FOR PICK-UP PARENT	DELITER SATURDAY and the country of	CONSTRUCT SHIFTELLING SCHOOL PORTO	7 Onta srout serect 15 Regular 15	ALTONOMY PACKARY
FEDERAL.	Sender's Federal Express Account Number	From (Your Name) Please Print	Company	Serest Address	3	YOUR BULING REFERENCE INFORMAL	PATABLEST In Sender In Production	SEAVICES	1 Comptons 6 LETTER	2 COUNTER-PAR 7 C	3 Operanient	4 OPTRIBLIT 9	S STANDARD 10

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: ICP-W-0050-88

The Relative Percent Difference is not calculated for Barium since the sample values are less than five times the reporting limit. Acceptable RPD in this case is defined as duplicate values within one detection limit of each other.

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

からない方がって、

OR001 Job No.:

Client: Attn: Address:

ES Oak Ridge Bill Hayden

710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, In.

QC Report for Laboratory Sample No(s):

Duluth ANGB

Project:

Sample Matrix: Date Received: QC Report No: Conc. Unit:

VGC-W-0051-88 Water ng/L

Date Prepared: Date Reported: Date Analyzed:

10-27-88 9-26-88

Dilution Factor:

Laboratory Supervisor Approval:

	88092322-88092325 88092327-88092332 88092348-88092356, 88092388	88				Wester	do			
Laboratory Sample No.	Compound	SA	SR	MS	- PR	MSD	PR	RPD	ES RPD	QC Limits #Recovery
-	Halocarbons: 8010									,
l 88092388	i 1,1-Dichloroethane	- - -	Q.	9.50	1 95	9.36	ħ6 -	2	56	70-130
	Trichloroethene	10	Q.	11.3	113	10.8	108	 2	19	65-131
	Chlorobenzene	10	QN .	11.4	114	11.2	112	2	0†0	59-137
2	Aromatics: 8020					ambuan st	-	-	****** ***	
88092388	Benzene	10	Q.	11.1	1111	11.3	1113	~	1 20	56-146
32	Toluene	10	ON —	11.4	114	11.6	1116	2	1 41	42-150
•	Chlorobenzene	10	QN -	10.5	105	11.2	112	9	36	76-133
Relative Per	Relative Percent Difference (PR) = MS -	MSD × 100	0							

(MS + MSD)/2

- SR x 100

Percent Recovery (PR) =(MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate

SR = Sample Result
SA = Spike Added (Concentration)

Not Applicable Not Calculated NA II

Not Detected

88-A1-DULU0174 1

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

透透

Description of the last of the

OSCANINASSAIN

VGC-W-0053-88

Water ng/L

Sample Matrix:

Conc. Unit:

QC Report No:

OR001 Job No.

710 S. Illinois Avenue Bill Hayden Suite F-103 Cllent:

ES Oak Ridge

37830 Oak Ridge, In.

Duluth ANGB Project: QC. Report for Laboratory Sample No(s): 部分。 88092389-88092391

88092422-88092427

Laboratory Supervisor Approval:

7.

10-27-88 9-26-88

Dilution Factor:

Date Analyzed: Date Reported:

9-17-88

Date Received: Date Prepared:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	P.R.	RPD	ES RPD	QC Limits
	Halocarbons: 8010							-		
88092425	1,1-Dichloroethane	5 5	22	10.0	100	9.32	1 93		1 26	70-130
4 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Chlorobenzene	5 6	2 <u>2</u>	11.3	113		=	· N) }	59-137
2:	Aromatics: 8020									
88092425	Benzene	10	- GN	10.8	108	10.8	108	0	50	56-146
3	Toluene	10	QN —	11.2	1112	11.0	110	2	1 41	42-150
-	Chlorobenzene	10	2	10.5	105	10.6	106		36	76-133

MS - MSD (MS + MSD)/211 Relative Percent Difference (PR)

- SR x 100 Percent Recovery (PR) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate SR = Sample Result SA = Spike Added (Concentration)

Not Calculated Not Detected Not Applicable

88-A1-DULU0205 1

高級のはないない カイナル こと

Job No: Glient: Attn: Address:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, Tn. 37830

Duluth ANGB

Project:

Sample Matrix: Conc. Unit: Date Reported:

Water ug/L 10-28-88

Laboratory Supervisor Approval:

		<u>.</u>	
Inclusive Sample Nos.	88092388-88092390	88092391	
CRDL	0.25	0.25	team take alon plan agen man open 5000 man from Middles
Conc	3.6	4.0 9.4 1	odger tilbak spekk degen ikkan kelair dahin pilan dagan tilbatikan
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane Chloroform	
CAS Number	75-09-2 67-66-3	75-09-2	n man organ hawa darin mana asam atam man man feet Annaa
Instru- ment ID	Vocol	Carbopack 75-09-2	n ajaun mang apan ajaun ayan ang ayan apan apan nama nama ang
Fraction	NGC	D D A	m mann piggi primer disab blade pigger primer danim form disab primer
Date Analyzed	9-16-88	9-16-88	n ann ann ann ann ann ann ann ann ann a
File ID	<u>2</u>	134 E	

NA = Not Applicable NC = Not Calculated ND = Not Detected

SR = Sample Result
SA = Spike Added (Concentration)

MS = Spike Sample MSD = Spike Duplicate

X 100

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2}$

Percent Recovery (PR) = $\frac{SSR - SR}{SA}$ x 100

•
m
_
വ
90
\supset
_
⊋
Ģ
_!
4
က်
88
~

1							
Seoff-dungation							
ectopolarios (TPH-W-0072-88		88 88 88 88		oval:	
Armultanine.		TPH-W-	Water mg/L	NA 9-23-88 9-26-88 11-01-88	NA	or Appr	
e special sector			•		•	ervisor	
K-cytoroningents		QC Report No:	Sample Matrix: Conc. Unit:	Date Received: Date Prepared: Date Analyzed: Date Reported:	Dilution Factor:	Laboratory Supervisor Approval:	
Enthuni Acades	MMARY IETERS	QC Re	Sampl Conc.	Date Date Date	Dilut	Labora	
TROUGHAMAIN S	QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS						
FYNAROBIORINA.	OL RESU QUALIT HYDRO					2390	
heffderförlaggag agere	Y CONTRIMENTAL					1, 38-8809	
· ges enterprised	QUALITY ENVIRON PE					aboratory Sample No(s); 88092291-88092293, 88092305-88092306 88092315-88092317, 88092312, 88092321, 88092354, 88092324, 88092349, 88092358-88092390	·
A SECTION AND A SECTION ASSESSMENT ASSESSMEN				4		92305-8 92312, 092349,	
इन्द्रामसम्बद्धाः निरमाधित्				Avenue 37830		No(s): 3,880 7,880 24,88	
Andreas Handre			idge den	710 S. Illinois Avenue Suite F-103 Oak Ridge, Tn. 37830	1GB	QC Report for Laboratory Sample No(s); 88092291-88092293, 8809 88092315-88092317, 8809 88092354, 88092324, 880	
**************************************		OR001	ES Oak Ridge Bill Hayden	710 S. Illinoi Suite F-103 Oak Ridge, Tn.	Duluth ANGB	oratory 3092291- 3092315- 3092354,	
		0	ங் ஐ	r ũ ö	ದ	or Lab 88 88	
		 o	ĭ;	 80 80	ct:	port fo	atoru
第三日本学生を表示です。 第二日本学生を表示でする。 第二日本学生を表示でする。 第二日本学生を表示できる。		Job No.:	Client: Attn:	Address:	Project:	QC Re	Laboratory

経過でき

, , Opening with a

Laboratory Sample No.	Anal Method	Blank	SR	SA	MS.	PR	MSD	P.R	RPD	Notes
Blank	418.1	<1.5	<1.5	39.5	38.5	76	37.5	95	33	*
2135										
* See Case Narrative attached.	ve attached.									

CASE NARRATIVE QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: TPH-W-0072-88

Insufficient sample was available for quality control purposes. The laboratory control sample is designated as a quality control sample for this batch.

The reporting limit for the samples in this batch is provided by the sub-contract laboratory.

VOLATILE CONTINUING CALIBRATION CHECK

の対象を

会議が記録

でははなります。

instantantantal

A STATE OF THE PARTY OF THE PAR

AND DESCRIPTION OF THE PERSON

Salar Market

LabName: _E	NGINEERING SCIENCE		Contrac	t:	
Lab Code:_	Case No.:	SAS	No.:		
Instrument	ID: VOCAL	Calib	ration D	ate(s):	9/16/88
LAB FILE	ID: 19,20	Init.	Calib.	Date(s	9/14/88

COMPOUND	RRF	RRF50	%D
Benzyl chloride	4.56	5.59	-22.53
bis (2-choroethoxy)			
methane	0.12		NA
bis (2-choroisopropyl			
ether	0.12		NA
Bromobenzene	3.08	4.01	-30.44
Bromodichloromethane	4.57	3.80	16.84
Bromoform	3.13	2.40	23.30
Bromomethane	0.43	0.15	66.37
Carbon tetrachloride	4.72	3.70	21.59
Chloroacetaldehyde	0.07		NA
Chlorobenzene	1.33	1.10	17.52
Chloroethane	0.73	0.32	55.70
Chloroform	3.99	3.20	19.82
1-Chorohexane	. 0.82	់.នរ	2.28
2-Chloroethyl vinyl ether_	0.12		NA
Ch) or chethane	1.84	0.42	77.16
Chloromethyl methyl ether_	0.02		NA
o_,m_,& p_Chlorotoluenes _	3.34	2.90	13.09
Dibromochloromethane	4.22	3.80	9.87
Dibromomethane	3.06	2.60	14.96
1,2_Dichlorobenzene	2.04	1.80	11.65
1,3_Dichlorobenzene	1.75	1.60	8.47
1,4_Dichlorobenzene	1.70	1.60	6.10
Dichlorodifluormethane	0.54		NA
1,1_Dichloroethane	2.70	1.80	33.23
1,2_Dichloroethane	3.29	2.70	17.87
1,1_Dichloroethylene	1.64	1.20	26.67
trans_1,2_dichloroethylene	2.69	2.20	18.13
Dichloromethane	2.98	2.60	12.78
1,2_Dichloropropane	3.01	2.50	16.98
1,3_Dichloropropylene	0.47	0.39	17.05
1,1,2,2_Tetrachloroethane_	3.38	2.80	17.15
1,1,1,2_Tetrachloroethane_	4.83	4.01	16.88
Tetrachloroethylene	4.55	4.20	7.74
1,1,1_Trichloroethane	2.65	2.10	20.88
1,1,2_Trichloroethane	4.42	4.14	6.33
Trichloroethylene	3.90	3.20	17.96
Trichlorofluormethane	0.88	0.55	37.29
Trichloropropane	3.08	4.01	-30.44
Vinyl chloride	1.84	0.42	77.16

のからなっていないである

<u> </u>	· · · · · · · · · · · · · · · · · · ·			
COMPOUND	RRF	RRF50	%D	
Benzene	4.	93 4.	80 -2	. 63
Chlorobenzene	4.	65 4.	90 5	.35
1,2 Dichlorobenzene	4.	64 4.	00 -13	.72
1,3_Dichlorobenzene	3.	99 4.	60 15	. 17
1,4_Dichorobenzene		20 3.	80 18	. 68
Ethyl Bezene	2.	98 3.	20 7	.21
Toluene	3.	54 3.	80 7	.27
Xylenes	9.	87 11.	00 11	.48

DATA PACKAGE #37 This page intentionally left blank.

600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

Job No.: ORO01

Client: ES Oak Ridge

Attention:

Many series and a home or seem of the man

Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Attached are the analytical reports for the water samples received by this laboratory on 9-13-88.

Sample Preparation Data

월 						
Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88092354	DANGB-BR5	BA-I	9-12-88		10-19-88	
88092354	DANGB-BR5	CD-F	9-12-88		10-24-88	
88092354	DANGB-BR5	CR-F	9-12-88		11-02-88	
88092354	DANGB-BR5	PB-F	9-12-88		10-25-88	
88092354	DANGB-BR5	418.1	9-12-88	9-28-88	10-05-88	
88092354	DANGB-BR5	8010	9-12-88		9-20-88	9-21-88
88092354	DANGB-BR5	8020	9-12-88		9-20-88	
[₹] 8809235 4′ 5	> -DANGB-BR5 (AS~F	9-12-88		10-26-88	
88092355	CDANGB-3-MW29-GW1	BA-I	9-12-88		10-19-88	
88092355	DANGB-3-MW29-GW1	CD-F	9-12-88		10-24-38	
88092355	DANGB-3-MW29-GW1	CR-F	9-12-88		11-02-88	
88092355	DANGB-3-MW29-GW1	PB-F	9-12-88		10-26-88	
88092355	DANGB-3-MW29-GW1	8010	9-12-88		9-20-88	9-16-38
88092355	DANGB-3-MW29-GW1	8020	9-12-88		9-20-88	
88092356	DANGB-TB5	8010	9-07-88		9-20-88	9-21-88
88092356	DANGB-TB5	8020	9-07-88		9-20-88	
콮						

* If applicable

1

ENGINEERING-SCIENCE INC. 01/04/89

ANALYSIS REPORT

VORK ORDER NUMBER: 970

TOB NUMBER : ZB0000000440

WORK ORDER DATE : 09/13/88

APPROVED BY

Lab Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

DAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT : BILL HAYDEN

(615) -481-3920

TASK: 2, UNITS: mg/L

	DANGB-BR5	DANGB-3-MW29- GW-1
TEST COMPOUND	88092354	88092355
ACID 'IG FLAME ACID DIG FURNACE ARSENIC BARIUM CADMIUM CHROMIUM 4ERCURY LEAD	NA NA <.05 <.001W 0.002B <.005	NA NA <.005N <.05 <.001 .0027B NT <.005W

YA- NOT APPLICABLE

IT- NOT TESTED

ID- Not Detected

ENGINEERING-SCIENCE INC. 01/04/89

PAGE :

ANALYSIS REPORT

WORK ORDER NUMBER: 970
JOB NUMBER: ZB0000000440 APPROVED BY MUSICAL WORK ORDER DATE : 09/13/88

Lab Supervisor

REPORT DATA:
ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

DAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO #

: OR001

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 3, UNITS: mg/L

DANGB-BR5 DANGB-3-MW29-

TEST COMPOUND

GW-1 88092354 88092355

§418.1 PETROLEUM HYDROCARBONS <1.5

NT

ND - Not Detected NT- NOT TESTED

ENGINEERING-SCIENCE INC. 12/05/88

ANALYSIS REPORT

FORK ORDER NUMBER: 970

OB NUMBER : ZB0000000440

ORK ORDER DATE : 09/13/88

APPROVED BY RU

Lab Supervisor

EPORT DATA:

S OAK RIDGE/DULUTH ANGB 10 S. ILLINOIS AVE. STE. S103 AK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

OF REPORT COPIES: 1

ONTRACT / PO #

: OR001

CONTACT

: BILL HAYDEN

(615) - 481 - 3920

'ASK: 4, UNITS: ug/L, GROUP 8010

		DANGB-3-MW29- GW-1	DANGB-TB5
EST COMPOUND SENZYL CHLORIDE SIS (2-CHLOROETHOXY) METHANE SIS (2-CHLOROISOPROPYL) ETHER ROMOBENZENE ROMOFORM ROMOFORM ROMOETHANE CARBON TETRACHLORIDE CHLORAL CHLOROBENZENE CHLOROFORM CHLOROFORM CHLOROHEXANE CHLOROMETHANE CHLOROMETHANE CHLOROMETHYL VINYL ETHER CHLOROMETHYL METHYL ETHER CHLOROTOLUENE DIBROMOCHLOROMETHANE COLICHLOROBENZENE COLICHLOROBENZ			88092356
BENZYL CHLORIDE	ND	ND	ND
IS (2-CHLOROETHOXY) METHANE	ND	ND	ND
IS (2-CHLOROISOPROPYL) ETHER	ND	ND	ND
ROMOBENZENE	ND	ND	ND
ROMODICHLOROMETHANE	ND	ND	ND
ROMOFORM	ND	ND	ND
ROMOETHANE	ИD	ND	ND
ARBON TETRACHLORIDE	ND	ND	ND
HLORACETALDEHYDE	ND	ND	ND
HLORAL	ND	ND	ND
HLOROBENZENE	ND	ND	ND
HLOROETHANE	ND	ND	ND
HLOROFORM	13B	0.26B	ND
CHLOROHEXANE	ND	ND	ND
:-CHLOROETHYL VINYL ETHER	ND	ND	ND
:HLOROMETHANE	ND	ND	ND
:HLOROMETHYL METHYL ETHER	ND	ND	ND
HLOROTOLUENE	ND	ИD	ND
IBROMOCHLOROMETHANE	ND	ND	ND
IBROMOMETHANE	ND	ND	ND
.,2-DICHLOROBENZENE	ND	ND	ND
.,3-DICHLOROBENZENE	ND	ND	ND
.,4-DICHLOROBENZENE	ND	ND	ND
CHLORODIFLUOROMETHANE	ND	ND	ND
.,1-DICHLOROETHANE	ND	1.3	ND
, 2-DICHLOROETHANE	ND	ND	ND
.,1-DICHLOROETHYLENE	ND	0.71	ND
: ANS-1,2-DICHLOROETHYLENE	ND	1.7	ND
)ICHLOROMETHANE	0.93B	0.32B	0.88B
.,2-DICHLOROPROPANE	ND	ND	ND

ID - Not Detected

ENGINEERING-SCIENCE INC. 12/05/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 970

TEST COMPOUND	DANGB-BR5 88092354	DANGB-3-MW29- GW-1 88092355	DANGB-TB5 88092356
1ESI COMPOND	00092334	00092333	00032330
	***		V5
-1,3-DICHLOROPROPYLENE	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND
11,1,1,2-TETRACHLOROETHANE	ND	ND	ND
TETRACHLOROETHYLENE	ND	3.1	ND
1.1.1-TRICHLOROETHANE	ND	11	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND
TRICHLOROETHYLENE	ND	13	ND
IRICHLOROFLUOROMETHANE	ND	ND	ND
TRICHLOROPROPANE	ND	ND	ND
TVINYL CHLORIDE	ND	ND	ND
·			

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/05/88

ANALYSIS REPORT

ORK ORDER NUMBER: 970

OB NUMBER : ZB0000000440

APPROVED BY ORK ORDER DATE : 09/13/88

EPORT DATA:

S OAK RIDGE/DULUTH ANGB 10 S. ILLINOIS AVE. STE. S103 AK RIDGE, TN 37830

ILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OR001

ONTACT : BILL HAYDEN

(615) -481-3920

'ASK: 4, UNITS: ug/L, GROUP 8020

	DANGB-BR5	DANGB-3-MW29- GW-1	DANGB-TB5
EST COMPOUND	88092354	88092355	88092356
ENZENE	ND	ND	ND
HLOROBENZENE	ND	ND	ND ND
, 2-DICHLOROBENZENE	ND	ND	ND
,3-DICHLOROBENZENE	ND	ND	ND
, 4-DICHLOROBENZENE	ND	ND	ND
THYL BENZENE	ND	ND	ND
OLUENE	ND	ND	ND
YLENES	ND	ND	ND

ENGINEERING-SCIENCE INC. 12/05/88

ANALYSIS REPORT

VORK ORDER NUMBER: 970
UOB NUMBER : ZB000000440

WORK ORDER DATE : 09/13/88

APPROVED BY

Supervisor

REPORT DATA:
ES OAK RIDGE/DULUTH ANGB
710 S. ILLINOIS AVE. STE. S103
PAK RIDGE, TN 37830
BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103 OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OR001

CONTACT : BILL HAYDEN

(615) -481-3920

4, UNITS: ug/L, GROUP 8080

TEST COMPOUND	DANGB-3-MW29- GW-1 88092355
ALDRIN	NT
ALPHA-BHC	NT
BETA-BHC	NT
DELTA-BHC	NT
GAMMA-BHC	NT
CHLORDANE	NT
4.4'-DDD	NT
4 4/_DDB	NT
A, 4'-DDT	NT
DIELDRIN	NT
ENDOSULFAN I	NT
	NT
#ENDOSULFAN II #ENDOSULFAN SULFATE	NT
ENDRIN	NT
ENDRIN ALDEHYDE	NT
HEPTACHLOR	NT
HEPTACHLOR EPOXIDE	NT
KEPONE	NT
-METHOXYCHLOR	NT
POXAPHENE	NT
PCB-1016	NT
PCB-1221	NT
PCB-1232	NT
PCB-1242	NT
PCB-1248	NT
PCB-1254	NT
₹PCB-1260	NT

ND - Not Detected

Not Tested

ENGINEERING-SCIENCE

111111111111111111111111111111111111111							
OR001	PROJECT NAME/LOCATION Duluth ANGB/Duluth, Mn.	lh, Mņ.	, ON		WATER ANALYSES REQUIRED		ENGINEERING-BORNCE
SAMPLEN(S): (Signature)	Signature)		OF COX-		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		LABORATORY, INC. 600 Banereft Way Berkeley, CA 94710
DATE TIME	SAMPLE DESCRIPTION		TAINERS		A. 42		REMARKS
9/11/88/0930	DANUB-BRS		4	\searrow		1) 14 VI.	7,110
1/11/W 1415	DANG 133-MW 29-6W-1	1-M	2	×			1
							(100 2 000
	/ /						
	100						
		•					
	· (1)						
			-				
_							
Melinquished by: (Signature)	(Signature) Date/Time	Received by: (Signature)		Melinquished by: (Signature)	(Signature)	Date/Time	Received by: (Signature)
	十	9490314190	-				
Melinquished by: (Algnature)	(Signature) Date/Time	Repeived for Laboratory, by:	by: 109	13/88 9:30	Romarka Saniyales	1200010	any les received (seel and intact.
		12000	77	,	,		

Distribution: Original Accompanies Shipment, Copy to Coordinafor Field Files

21/8

ENGINEERING-SCIENCE

076

CHAIN OF CUSTUDY RECORD

ES JOB NO.	PROJECT NAME/LOCATION				WATER ANA		
OR001	Duluth ANGB/Duluth, Mn.	h, Mn.	NO.	1	REQUIRED) d	FINDINEERING-BCIENCE
SAMPLEM 8): L	SAMPLEM B): (Mentiure)		O.	0,			600 Bancroft Way
/ John	L. Cran		CON-	/		i e a	Berkeley, CA 94710
DATE TIME	SAMPLE DESCRIPTION		TAINERS			a company	REMARKS
9/12/8x 0930	DANGB- BRG		5	1			88935.4
alv 34 1415	DANGB-3- MW 24-6W-1	745	X750x	×			382355
97/58/0930	DANGB- TBS		7	×			882355
9/2/63 11715	DANGB-FB9		1,1	×		Frey Holanks	1.0000
						FIELD BLANKS	55 Fac
						4 AW 24-6W-	1-1.
						-I 030001	02 40
		•					
	· ////:						
	All						
\							
Relinquished by:	Date/TIme	Received by: (Signature)	•	Relinquished by: (Signature)	: (Signature)	Date/Time Rec	Received by: (Signature)
Morly 2. Ouris	0021 /25/21/6	Fed FxA1,1,1/1.# 9490312190					
Nellnquished by: (Signature)	(Mgnature) Date/Time	(Signature) (Str. Vaboratory, by:		12:12 82/5//60	Romarka (SVCC) VOC)	recovered colel	cold and intact

Distribution: Original Accompanies Shipment, (Copy to Coordinator Field Files

21/19

	066 TED 616	7		(4K) AXXA	erment/Floor Mg.	•	01.040		ZP Peoples	Federal Express Use		Declared Value Charge	Oher 1	Other 2	Total Charges	600	THE FEC
	TRACEMBER 1919		SEMDER'S COPY	1 Street	3 Exercise Time	. 14 West	H V J Series	IF NOLD FOR PICK-UP, Print FEDEX Address Nove Street		SEATICE COMPITIONS, DECLARED INLUE	AND LIMIT OF LANGILITY	y of the artist to factor relormation. enable for any clean in encoses of 3100 per	is result of less, damage, datay or van dalway. Nights presult in the specie to the left, pay 402 procined and document your actual toes in the parture annoted benefacts, found in this control	were Gueste apply Your egitte to necroes trans see of the missing value of the policings, as well costers, interest parts, altouring feed, colois and age wheatte found incoloring, consequential or	s greene ut \$100 er bis declande velus ignecibed E brief januar verbievy enched your achief lass. Py deferent, Folgere Expessa will at your velusiest one, velund all temponation changes paid. See	Sender authorizes Federal Express to defens this ship- sender authorizes Federal Express to defens this ship- indemnity and hold harmless Federal Express from any	
٠	ALASEA AND MANAGE TRACKING		S	To (Pecipient's Name) Please Print	Company	Exact Street Address (the Council)	*	F HOLD FOR P	Š	SEMME CO	Use of this sich	Mot of series cop	COCCAGOL, whether the united by the specially as part adhibition \$1000 and \$10000 and \$10000 and \$10000 and \$10000 and \$10000 and \$10000 and \$1000	Factorial Engineers Ser factorial Engineers for its an 300 tous of sealers or any other form of dear	DOCUMENT TO GOOD TO THE CONTROL OF T	5	Chine reading herefore Reference Squater
7. F.C.M. W.C.M.	AIKBILL MINGEL CA. ALM	The Table of the Control of the Cont	1	Number (Mary Emportung	Department/Floor No.	J. F. 167		APPEAR ON INVOICE,	rst Ns.	PHERAGES BELIEFT PR	62.1		. \$6.7	(CSS) Total Total Total	Referred Al 1C Regular Stop 2 D On-Cal Stop 3 D A D	Drop Box B.S.C FEDEX Corp. Employee No	Date/Time for FEDEX Use
	MATTER ARREST POR DOMITTIC SAMPHERS IN SEE THE HITTERSTOOMS AND SENTENCES TO PORTITIONS! CALL DOS -250-3505 THE FARE	TEL LEGISTE	Date	Your Phone	Mile Jin	1, 1/2	Sam III Proping	IN [FIRST 24 CHARACTERS WILL APPEAR ON INVOICE]	Fedfia Acct. Na. 🔝 Rip Jed Party Fedfia Acct. Na.	DELIYERY AND SPECIAL HANDLING	1 NOLD FOR PICK-UP STATE	2 SELIVER WEEKDAY	3 DELIVER SATURDAY com court	S CONSTRUCT SOMFILLINGS SEPTICE (CSS)	7 O STREET SPECIAL SCHOOL	9 Saftware 197	12 SMIANT DESTRET Promotes
, W	E CONTRACTOR		Try CHITCH 200 8	on (Your Name) Please Print	is from the second of the second	Market Comment	Juny 152	TOOR BILLING REFERENCE INFORMATION	NYMENT Kim Sandar Der Pacsparin F	: SERVICES	A PRINGING 6 OFFICER		COUNTE-PAR 7	O PYTAMENY 6	4 DOTERMENT 9	· 🗆	of the form, solities from social bearies day * Declara Valva Limi \$100.
	•				8		Ad (O.	00	S	A B		**			31.11	1 7 n	

Kiri .

QUALITY CONTROL RESULTS SUMMARY METALS

がない こい

Contraction (No.

Charles and Albert Party

Sential Control of Al

Willeman Lightle

THE PERSON NAMED IN

ICP-W-0050-88

Water ug/L

Sample Matrix: OC Report No:

Conc. Unit:

11-07-88 9-13-88

Dilution Factor:

Date Received: Date Reported:

OR001 Job No.: ES Oak Ridge Client:

Bill Hayden Address:

Attn:

710 S. Illinois Avenue 37830 Oak Ridge, In. Suite F-103

Duluth ANGB Project:

88092348-88092350, 88092354-88092355 88092388-88092390, 88092422-88092427, 88082189 QC Report for Laboratory Sample No(s):

Laboratory Supervisor Approval:

Notes

PR

2.47

0.089

2.00

Š

Spike Recovery

SA

RPD

Duplicate CI **Blank** Method Anal Date Prep Date Anal Sample Nos. Spike Laboratory Duplicates Analyte

0.064 0.089 <0.2 6010

88092348 10-20-88 10-18-88 88092348

Barium

2151

- See Case Narrative attached

x 100 (c1 + c2)/2 $c_1 - c_2$ Relative Percent Difference (RPD)

Percent Recovery (PR) = SSR - SR x 100

Cl = Concentration One C2 = Concentration Two

NA = Not Applicable NC = Not Calculated ND = Not Detected

SSR = Spiked Sample Result

SR = Sample Result SA = Spike Added (Concentration)

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO.: ICI-W-0050-88

The Relative Percent Lifference is not calculated for Barium since the sample values are less than five times the reporting limit. Acceptable RPD in this case is defined as duplicate values within one detection limit of each other.

2152

38-11-0ULU034"

CN-FRMOI

QUALITY CONTROL RESULTS SUMMARY METALS

A. Sales

MARKET MERCAND

Constitution of the

CHIEF THE

e tambilitate dibité

इंग्डन्तामध्यिक्ष्माक्ष्ये क्

d - billion (George

THE STATE OF

C-willinging

i decelle de comment

OR001 Job No.:

ES Oak Ridge

Bill Hayden Address: Client: Attn:

710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, In.

Dilution Factor: Date Reported: Date Received: Sample Matrix: Conc. Unit:

AAF-W-0031-88 ug/L 8-31-88 11-07-88 Water QC Report No:

> Duluth ANGB Project:

QC Report for Laboratory Sample No(s): 88092348-88092350, 88092354-88092355, 88092317 88092388-88092390, 88092422-88092427, 88092189

Laboratory Supervisor Approval:

Wotes

Analyte	Laboratory Duplicates	Laboratory Sample Nos. Duplicates Spike	Date Anal	Date Prep	Anal Method	Blank	CI D	Duplicate Cl C2	RPD	SA	Spike R SR	Spike Recovery SR SSR	쫎
Arsenic	88082189	88082189	10-26-88	10-18-88	1060	7060 <0.010 <0.005 <0.005	<0.005	<00.005	NC	0.040	<0.005	0.040 <0.005 0.0517	129N
Chromium	88082189	88082189	10-26-88	10-18-88	6010	<0.005 <0.002 <0.002	<0.002	<0.002	NC	20.0	20.0 <0.002 21.6	21.6	108
2j	2 88082189	88082189	10-25-88	10-18-88	7421	<0.010 <0.005 <0.005	<0.00	<0.00>	NC	0.020	0.020 <0.005 0.0227	0.0227	114
53mi nag	Cadmium 88092348	88092348	10-20-88	10-18-88	6010	6010 <0.005 <0.001 <0.001	<0.001	<0.001	NC	0.050	0.050 <0.001 0.038	0.038	9/

- See Legend attached.

X 100 Relative Percent Difference (RPD) = $\frac{\text{Cl} - \text{C2}}{(\text{Cl} + \text{C2})/2}$

Percent Recovery (PR) = SSR - SR x 100

C1 = Concentration One C2 = Concentration Two

NA = Not Applicable NC = Not Calculated ND = Not Detected SSR = Spiked Sample Result

SR = Sample Result SA = Spike Added (Concentration)

The state of the s		ووالمراجع والمستخدم والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع	***************************************						
D & Notes	TR RPD	MSD	PR	MS	SA	SR	Blank	Anal	Laboratory Sample No.
	(A)	WBuk	- Ol	0	092306 8092321, 88092388-88092390	-8809230 , 880923 9, 88092	No(s): 3, 88092305 7, 88092312 14, 8809234	port for Laboratory Sample No(s): 88092291-88092293, 88092305-88092306 88092314-88092317, 88092312, 88092321	Of Report for
	Laboratory Supervisor Approval:	tory Supervi	Labora					" Duluth ANGB	Project:
	NA AN	Dilution Factor:	Diluti					s S	
	9-26-88 $11-01-88$	Date Analyzed: Date Reported:	Date A				37830	State F-103	
	9-23-88	Date Received:	Date P				lvenue	710 S. Illinois Avenue	Address
	mg/L	Unit:	Conc. Unit:					ES Oak Ridge Bill Hayden	Olitent:
	TPH-W-0072-88 Water	QC Report No: Sample Matrix:	QC Rep. Sample					OR001	Job No.:

	95	37.5		38.5	39.5	(1.5	<1.5	418.1	Blank E
RPD Notes	PR	MSD	PR	MS	SA	SR	Blank	Method	Sample No.
								, Anal	Laboratory

٤.
٠.
٠.,

	x 100
	MS - MSD 4S + MSD)/2
	= (
ed.	(RPD
Narrative attached	Percent Difference
ative	t Diff
Narr	Percen
Case	tive P
Se	Re 1a

Ent. (PR) =
$$\frac{SSR - SR}{SA}$$

QC-FRMO 7W

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: TPH-W-0072-88

Insufficient sample was available for quality control purposes. The laboratory control sample is designated as a quality control sample for this batch.

The reporting limit for the samples in this batch is provided by the sub-contract laboratory.

2155

THE PROPERTY OF THE PROPERTY O

とで、これなどのなるのはないのでは、

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

:

:: ;;	CH001	QC Report No:	VGC-W-0051-88	
		Sample Matrix:	Water	
: 1:11:	ES Oak Ridge	Conc. Unit:	ug/L	1
::	Pill Hayden	Date Received:	HA	1
2000	710 S. Illinois Avenue	Date Prepared:	MA	
	Suite F-103	Date Analyzed:	9-26-88	
	Uak Ridge, In. 37830	Date Reported:	10-27-88	
		Dilution Factor:	MA	
r i swef.	Puluth ANGB			

Laboratory Supervisor Approval:

Format for Laboratory Sample No(s):

	\$8092327-88092325 \$8092327-88092332 \$8092348-88092356, 88092388		e e e e e e e e e e e e e e e e e e e			12.05 Sec. 2007	14.77			eni jaris Sugar
at watory	Compound	SA	SR	MS	PR	MSD	G.	RPD	ES	QC Limits #Recovery
	Halocarbons: 8010				بي کنچون			***	ره مصب	- · · · · · · · · · · · · · · · · · · ·
830 "	i i.i-Dichloroethane	10	<u> </u>	05.6	- S	9.36	16	~ :	92 :	70-130
		<u> </u>	<u> </u>		113	10.8	108	د د	£ 5	65-131 59-137
	Armatics: 8020									
21		<u>2</u>	2			11.3	113	۰ د -	50	56-146
56	f Felugue Chlorobenzene	2	= E &	11.4	105 105	11.6	116	~	36	42-150 76-133
o, it tre for	o, it tye Percent Difference (PK) = MS - MSD	MSD x 100	0							alibraturis de l'articul est su l'articul de
	2/ (CSW + SW)	2/(25/								

2/(GSW + SW)

- SR x 100 a. ent hecovery (Ph) = (MS or MSD)

MS = Spike Sample MSD = Spike Sample Duplicate

SR = Sample Result SA = Spike Added (Concentration)

Not Applicable Not Calculated Not Detected A CO E

t Winding the

! !

METHOD BLANK SUMMARY

ではないというないということのないないないないからいからいないということということということにはないないないないないないないできないということにはないないないないできないというというというというという

意と

Supplemental Supplement

oguseemestare .

4 Secretarian

Population of the service of the ser

OR001 Job No: Client:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Attr: Address:

37830 Oak Ridge, In.

Duluth ANGB

Project:

Sample Matrix: Conc. Unit:

Water ug/L 10-31-88

Date Reported:

Laboratory Supervisor Approval:

	agailtean raidh ann da		
Inclusive Sample Nos.	88092348-88092349 88092354-88092356	\$ 88092350-88092353	
CRDL	0.25	0.25	
Conc	1.4	7.	
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane	
CAS Number	75-09-2 67-66-3	75-09-2	
Instru- ment ID	 Carbopack 75-09-2 67-66-3		
Fraction	NGC	NGC .	
Date Analyzed	9-20-88	9-15-88	
File ID	82	35	2157

רעזועט נוז

This page intentionally left blank.

DATA PACKAGE #38

This page intentionally left blank.

600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

Job No.: OROO1

Client: Attention:

ES Oak Ridge Bill Hayden

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Attached are the analytical reports for the water sample(s) received by this laboratory on 9-19-88.

Sample Preparation Data

เกรสาทีที่เกลสาก	Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.	,
одинамини).	88092508	DANGB-3-MW27-GW-1	8270	9-16-88	9-23-88	10-30-88		

* If applicable

CASE NARRATIVE QUALITY CONTROL RESULTS SUMMARY SAMPLE NO(S).: 88092508 WORK ORDER NO.: 1004

This water sample were received at the ES Berkeley Laboratory on 9-19-88. It was received cold and intact.

The matrix spike analysis associated with these samples resulted in good recoveries and RPD's for all spiked compounds, but the following non-standard situations were present.

First, the base neutral MSD was analyzed slightly out of tune time, i.e., more than twelve hours after the tuning of the instrument was verified. This extract was re-analyzed out of holding time. Both analyses met EPA QC limits for recoveries and RPD's. Both analyses are included in this report.

Secondly, the 6th internal standard of the acid MSD did not meet QC criteria. This analysis was repeated with the same result. This internal standard was not used for calculating any of the acid matrix spike compounds.

ENGINEERING-SCIENCE

1007 LOOI

CHAIN OF CUSTODY RECORD

ENGINE ENGINE SOLITION ROOT TIME FROM RECORDS AND THE SOLITION RECORDS	48	ES JOB NO.	PROJECT NAME/LOCATION		***************************************	WATER	WATER ANALYSES	SHIP TO
9.00	Ö	7001	Duluth ANGB/Duluth, Mn.	o O	1	RE	JOHNE D	ENGINERAND-SCIENCE
11 11 12 13 14 15 15 15 15 15 15 15	8 A M	1, EM 8): 1)	Janeture)	CON				600 Banareft Way Berkeley, CA 84710
9-16-18 12-45 DAING 18-5-3-mw 27-61/2/2 2 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	DATE		SAMPLE DESCRIPTION	TAINERS	20 3	0.4	WEE ME	
9-16-86 12-45. DANGS-3-MW27-61V-1 2. X 11:23 11:13 General media of today still following the state of today state of today still following the state of today st	9.16.5			8	××××	X		1 '
Minquished by: (Signature) Mi	9-16-8	38 11 45	DANG8-3-MW27-6W-1	7	×	20	20	michals and with Sterthis well yesterlay
Milinquished by: (Signature) Date/Ilme Received by: (Signature) Milinquished by: (Signature)								
Milinquished by: (Signature) Date/Time Received by: (Signature) Milinquished by: (Signature) Milinquished by: (Signature) Milinquished by: (Signature) Milinquished by: (Signature) Milinquished by: (Signature) Date/Time Received by: (Signature) Milinquished by: (Signature) Date/Time Received by: (Signature) Milinquished by: (Signature) Date/Time Received by: (Signature) Milinquished						-		
Dete/Time Received by: (Signalura) 7-16-88 1800 Fel (EX // // (4+								
Detertine Received by: (Signature) 7-16-88 1800 FEL (EX 1): 1 Clff 9-10-1710 Received by: (Signature) 1-10-88 1800 FEL (EX 1): 1 Clff 9-10-1710 Received by: (Signature) 1-10-88 1800 FEL (EX 1): 1 Clff 9-10-1710 Received by: (Signature) 1-10-88 1800 FEL (X 1): 1 Clff 9-10-1710 Received by: (Signature) 1-10-88 1800 FEL (X 1): 1 Clff 9-10-1710 Received by: (Signature) 1-10-88 1800 FEL (X 1): 1 Clff 1-10-1710 Received by: (Signature) 1-10-1710 Recei								
Delettine Received by: (Signature) 7-16-58 1500 4-70-58 1500 Add 0.3 1004-5 Delettine Received by: (Signature) Add 0.3 1004-5 Delettine Received by: (Signature) Add 0.3 1004-5 Delettine Received by: (Signature) Add 0.3 1004-5 Sour PIES Received by: (Signature) SR7 Was 2021 Received by: (Signature) SR7 Was 2021 Received by: (Signature) SR7 Was 2021 Received by: (Signature)								
Daie/Time Received by: (Signature) 7-16-88 1800 7-16-88								
Detertime Received by: (Signature) 7-16-88 1800 Aft 0.31004-5 Detertime Received by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) Aft 0.31004-5 Detertime Remarks 1 Somugal From Sam. Des DARCB SR7 was not received only 7 (Signature) (Signature) Relinquished by: (Signature) Aft 0.31004-5 SR7 was not received by: (Signature) (Signature) (Signature) (Signature) Relinquished by: (Signature) Aft 0.31004-5 Detertime Remarks 1 Somugal From Sam. Des DARCB SR7 was not received by: (Signature) (Signature)								
Detertime Received by: (Signature) 7-16-88 1800 7-16-88								
Deter Time Received by: (Signature) 7-16-88 1800 A403104-5 Deter Time Received by: (Signature) Deter Time Received by: (Signature) Bary (Signature) A403104-5 Deter Time Received by: (Signature) Bary (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A403104-5 Deter Time Received by: (Signature) A4003104-5 Deter Time Rece								
Detertime Received by: (Signature) 7-16-88 1800 7-16-88								
Detertime Received by: (Signature) 7-16-88 1800 Aft 031004-5 Detertime Received by: (Signature) Aft 031004-5 Detertime Received by: (Signature) BR7 was not received only 7 Sample Sample 1 Sample Sample								
Detertime Received by: (Signature) 7-16-88 1800 A49031004-5 Detertime Received by: (Signature) 7-16-88 1800 A49031004-5 Detertime Received by: (Signature) Received by: (Signature) 7-16-88 1800 A49031004-5 Detertime Remarks 1. Somujole from Sam. Des DAKOB Received on 14-7 Samples Received on 14-7 Samples Received by: (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature) (Signature)		1						
Detertine Received by: (Signature) 7-16-88 1800 9-40-031004-5 Detertine Received by: (Signature) 7-16-88 1800 9-40-031004-5 Detertine Remarks 1. Somujole From Sam. Des. DAKOB BR7 was not received, only 7 Samples Received, only 7 Samples Received.								
Date/Time Received for Laboratory by: Date/Time Remarks 1 Some, DE From San. DES DAKEB (Signature) / (Signature)	Bull &	y by:	9-16-88 1800	(##)	Relinquished by	tengis) s		
~- \\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \		ulehod by:	Date/Time	tory/by:	Dete/Time			From SAM. DES DAKES B.
			Call Site	<u> </u>	1/93/11/77		50~p 1ES	K (7 C 4.

ENGINEERING ECLENCE Priority Pollutant Analysis - Base Neutrals - 5W 8070 . Matrix: Water

Jate Redelved: September 19, 1988 ate Reported: December 9, 1988

Work Order: 1004 Job Number: ORG01

*GR: addresc:

ES:Oan Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden 710 S. Illinois Ave, Suite F-103

Oak kidge, TN 378.0

58)92198 ind Aumiel: DANGB-5-MW27angle No.: 1 - WC3-16-88 ute Sampled: 12:45 ind lample in v-23+c8 ate Extracted: 10-20-55 ate Allay (2004)

	Demession Limius ReyL	ANALYTICAL RESULTS (dry weight) ug/L	
		NE)	·
3-Dichloropenhene	±0	ME)	
exachiorbethane	10	N2	
sts(2-chlordetnyl)etner		ND	
,2-Dichlerobenzene	• • •	NI.	
-Nutresodimethylamine		ND	
lis 2-chloroisopropyl)ethm	: 1	39	
s-hitrocomi-n-propyramine	* *	:::	
exachloroputadiene	•	:: 2/	
, 1,4-Trichlorobenzene	. (*	N")	
.l-robensene	28	NI.	
incphorone	# 32 # 32	NE	
sphthalent	20	ħ *****	
ib: 2-c: 1c: Lethoxy ,nethan-	<u>4</u> 0	ΣT_{i}	
Inlia chapathalehe		NL	
	<u>.</u> :	N L	
-brhainthywene	10	NO	
	1.3		
imethyl pathalata	1 /	NO.	
l, dahimiti otollaene	<u> </u>	$\mathcal{J}_{\mathbf{L}^{\prime}}^{\mathbf{L}^{\prime}}$	
_u wene	Į.	ND	
,,==Dimitrorolugene	<u></u>	ND	
Liethyl gathmate		ND	
witiosociph fly Laming		NI.	
Chichbennen:	•	1.00	

Priority Pollutant Analysis . page 2 of 3 Base Neutrals - 5W 6276 Matrix: Water (continued)

1 201.01 11.00

2,0 -lichborupenssaine 20

lendo(r)pyrene

indeno.1,1,.-od)gyrene

Dibence, a, h: anthracene

Letital Assistant

pendogan, peryuene

Date Receives: September 19, 1988 Work Order: 1004 Jrb Numbers OR0.1 El:Oak hinge/Duluth AkGB - Affile Mr. Fill Hayden Address: 11 5. Illinois Ave, raite 8-100 Park Pringe, TN 5/830 uan Nembera 63 12-11 DAN 55-3-1463i. A Summas it .: more than the sample in the sample in GW-1 اغ ــ ز ر ـ ي 12:45 臺 Date Extracte as 9-20-68 [[Tate Analyseur Detection ANALYTICAL RESULTS
Limits (dry weight) uct, L ag /li Phenanthrene $V \supset$ | Antilacene 20 NDDibutvi phtmalate 20 7.0 100 Fla rantheme =-Thioropherys phenys ether 10) ML Birji Beniyi phthalate MI Pls Umethylhamyl, phthalath 4_ = Thuyrene 1.1 weers nothernyl phonyl ether ieno (a) anonnacene U. 1-m-bity Linthau ate 1.7 benzon lill rangnene Lenzon Llurangnene

0.0

:0 11) 11,

1...

13,

1.13

X

 N_L

 N_{-}

1, ,

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Water (continued)

Page 3 C1 5

Pate Received: September Exte Reported: December		Work Order: 1004 Cob Number: Ok (01
or: ES:Can Ridge/In. ddiress: 710 o. Filinois Oan Ridge, TN	Ave, suite F-103	ATTR: Mr. Eill Haysen
ample wo.:		85092308 OANGB-3-MW27 - GW-1
rate Sampled: ime Simpled: ete Extratten:		7-16-58 10:45 7-10-88
ate ana. vzení		19-36-88
-		Analytical Results (dry weight) ug (L
wretophenone	~-· y	NE ^c
	x	NI MB
	2 1	NI.
Caloronaphtnal ana		ND
•		NI NI
- idenzoluran - imetnylaminyarchenden	<u>.</u> (10 131
		NI)
,11-uimetnylmenn(s,amtm		Na.
-, a-Dimethylphenethylam	106	
aprietiyasmaks		NI NI
, u-1 linenylay is azamo		MD.
ny i hethanezu' fonare		:·_
	•••	4.6.* 1
STRIL AETRAMESCLIFT STA		
treinsuna Athai Me	•	• •
- Japhuny amine	we so g	is Z
~ NA . NTA / LUMINO	* _{1.}) (2)
-nitroanuline	* **	1\ h'
Witrwaniline	50	N)
-Nitroamiling	\$	N1)
itroso-mi-n-witylamin		**** *****
-Nutresobleericine	و سه ود	ND .
entachlorobensene		ND ND
enmachloromitrabenzene	p	KD
nenacetin	,	ND ND
	adm ==0 p	N 67 71 %
n-mamide	en en e	No.
.0,4,:-Terra nloropense	ing was	.:2

E/A has not yet det emines betortish limits for there gompounds.

Priority Follotant Analysis Pesticides and PCPs - SW 32/0 Matrix: Water

page 4 of 5

Pate Received: : Date Reported: !	September 19, 1988 Secember 9, 1988	Work Order: 1:04 Job Number: OR001
FOR: ES:Oak E Adoress: 710 S	Ridge/Duluth ANGB Ellinois Avo. Suite P-103 (e. TN -37820	ATTN:Mr. Eill Hayden
Lap Number: Sample Ni.: Date Sampled: Time Sampled: Date Extractions		38 093506 DAN 15MW. 7- GW-1 8-15-88 17:45 5-20-83 10-30-83
Compound	berection Limits ug/L	ANALYDICAL RESULTS (nry welynt) (worl
Alpha-BHC Beta-sdc Beta-sdc Heptachlor Lelta-BdC Heptachlor Lelta-BdC Heptachlor Heptach		MD ND ND ND ND ND ND ND ND ND ND ND ND ND

EPA has not yes determined date tion in its ser bless someomes.

Priority Poliutant Analysis Acid Extractables -- SW 8270 Matrix: Water

ate	Received:	September 19, 1988
)are	Reported:	December 9, 1985

Work Order: 1004 Job Number: Oko61

OR: Es:Oak Ridge/Duluch ANGB

AT' N: Mr. Bill Hayden

address:710 S. Illinois Ave, Suite F-193 - Oak Risge, GN - 27830

a Number:	88.921.8
ample Re. F	DAN 3E - 3 - MW 27 -
	GW-1
Site bamp.elv	2-26-23
ine fampled:	11:49
Late Extracted:	3-13-58
Late Analydekk	130-58

ompound	Detection Dimits ug/L	ANALYTICAL RESULTS (Try weight) (g/L	
Chiorophenol		ND	
•	1)	116	
. Renol	4 · ·	ND	
1,4-Dimethylphenol	* 1.	h''	
.,e-Dichlerophenel	1 ')	
.,4,f-Tricalórophen i	<u>:</u> :	1 /1 pr4	
	<u>:</u> ()	<u> </u>	
ou, 4-Dinitrophen (l)	3 ()		
.:-Dichlor phan.l	A	20	
hernyl-4, t-1 in. th gireto.		::-/	
eutachic boynemoi	<u>.</u> .	;,,,)	
	£, _€ ,	$\kappa \nu$	
land 10 Acid	. :1	\'.)	
-metnylphenol	. 1	NO	
x 4-Mera ipaensi	20	. 10	
4, b- Tetrachiorophenol	p	N''	
.,4,5-Trichloropnenol	1 ()	141)	

1. (b) bar(2) 3, 3, (e)v12 % 3

BEA sad bit yet reseablings objection of and the research page will.

= lompound was detected in the blank. 2183

Complete are discounted to the rest of the are reported to a Other aboar whence are maken is supamined harber incline members

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 625/8270

Add Young

Contractor :

Constitution of the second

100年間の3番

Technology of T

SHAMMENDAR

CHARLES CONTROLS OF

QC Report No:	Sample Matrix:
ORG01	
Job No.:	

BNA-W-0055-88

Water ng/L

> 710 S. Illinois Avenue ES Oak Ridge Bill Hayden Address: Client: Attn:

37830 Oak Ridge, Tn. Suite F-103

Duluth ANGB Project: QC Report for Laboratory Sample No(s):

Laboratory Supervisor Approval:

Worder

12-27-88

Dilution Factor:

Date Reported:

9-22-88 10-29-88

9-17-88

Date Received: Date Prepared: Date Analyzed:

Conc. Unit:

88092508

EPA QC Limits RPD RECOVERY 46-118 41-116 12-89 27 - 12326-127 9 - 10339-98 10-80 24-96 36-97 23-97 28 33 33 28 28 50 42 40 50 RPD 8 25 6 60 68 60 71 71 60 25 63 64 63 49 PR 80.2 71.0 60.4 126 129 67.6 60.1 49.2 127 MSD PR 70 68 62 78 74 63 23 49 60 69 51 46.7 120 138 62.0 78.4 73.6 70.4 MS SR 22222 2222 200 200 200 200 SA N-Nitroso-di-n-Propylamine 4-Chloro-3-Methylphenol 1,2,4-Trichlorobenzene 1,4-Dichlorobenzene 2,4-Dinitrotoluene **Pentachlorophenol** Compound 2-Chlorophenol Acenaphthene Pyrene Phenol Laboratory Laboratory Sample # Fraction 88092490 Sample # ACID B/N

x 100 (MS + MSD)/2MS - MSD H Relative Percent Difference (RPD)

4-Nitrophenol

88092490

Percent Recovery (PR) = $(MS \text{ or } MSD) - SR \times 100$

MSD = Spike Duplicate SR = Sample Result SA = Spike Added (Cor MS = Spike Sample

NA = Not Applicable NC = Not Calculated ND = Not Detected

Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 625/8270

・ 野田の大田のはないないないないないのできる

BNA-W-0055-88: 9-17-88 9-22-88 2-20-88 11-23-88 Water ng/L Date Prepared: Sample Matrix: Date Received: Date Reported: Date Analyzed: OC Report No: Conc. Unit: 710 S. Illinois Avenue 37830 Oak Ridge, In. ES Oak Ridge Bill Hayden Suite F-103 OR001 Job No.: Address: Client: Attn:

Laboratory Supervisor Approval:

Dilution Factor:

QC Report for Laboratory Sample No(s): 88092508

Duluth ANGB

Project:

Fraction 1	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limits RECOVERY
0	1,2,4-Trichlorobenzene	100	QN	70.4	07	66.7	1 67	7	28	3998
B/N	Acenaphthene	100	<u>R</u>	68.2	68	67.4	67	_	31	46-118
Laboratory	2,4-Dinftrotoluene	100	£	62.0	62	61.5	62	Н	38	24-96
Sample #	Pyrene	100	ON	78.4	78	70.2	20	11	31	26-127
•	N-Nitroso-di-n-Propylamine	100	Q.	73.6	74	70.2	20	9	38	41-116
88092490	1,4-Dichlorobenzene	100	QN	62.9	63	61.5	62	2	28	36-97
									-	
ACID	Pentachlorophenol	200	<u>R</u>	46.7	23	62.2	31	30	20	9-103
Laboratory	Phenol	200	QN	99.0	67	115	28	17	4.2	12-89
Sample #	2-Chlorophenol	200	QN ON	120	09	128	94	9	40	27-123
	4-Chloro-3-Methylphenol	200	QN	138	69	120	09	14	42	23-97
88092490	4-Nitrophenol	200	QN Q	101	51	139	70	31	20	10-80

Relative Percent Difference (RPD) = $\frac{MS - MSD}{(MS + MSD)/2}$ X 100

Percent Recovery (PR) = (MS or MSD) - SR x 100

MS = Spike Sample MSD = Spike Duplicate SR = Sample Result SA = Spike Added (Concentration)

NA = Not Applicable
NC = Not Calculated
ND = Not Detected

M1 ...-30

1100'.... 1V-t-

METHOD BLANK SUMMARY

Lagby Mad

Section 4

ը, Գլույային արցագույ

OR001 Job No: Client: Attn: Address:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, In.

Duluth ANGB Project:

Sample Matrix: Conc. Unit: Date Reported:

Water ug/L 12-20-88

Laboratory Supervisor Approval:

,			
Inclusive Sample Mos.	88092494-88092495 88092508, 88092511 88092540	88092494-88092495 88092508, 88092511 88092540	
CRDL	ı	10	
Conc	ı	17	
Compound (HSL, TIC or Unknown)	None Detected	Bis(2ethylhexyl)phthalate	
CAS Number	l	117-81-7	
Instru- ment ID	-	2	
Fraction	A C	BN	
Date Analyzed	10-30-88	10-30-88	
File ID	s0302	E6019	2171

GC/MS TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFTPP)

Case No. 123456

Contractor Engineering Scien Contract No. 99999999

Instrument ID #1

Date / Time 11/06/88 11:21

Lab ID >T1106::D1

Data Release Authorized By: 5

m/2	! ION ABUNDANCE CRITERIA	I ARELATIVE ABUNDANCE
	30.0 - 60.0% of mass 198	
33	liess than 2.0% of mass 69	(0.00 OK (0.0C) #1
60	wass 69 relative abundance	70.94
70	less than 2.0% of mass 69	0.00 OK (0.00) #1
1 127	40.0 - 60.0% of mass 198	52.39 OK
197	less than 1.0% of mass 198	0.00 OK
-	base peak, 100% relative abundance	1 100.00 OK
	5.0 - 9.0% of mass 198	5.62 OK
•	1 10.0 - 30.0% of mass 198	1 16.82 OK
•	greater than 1.00% of mass 198	1 1.32 Ok
-	I present, but less than mass 443	1 6.22 CK
•	greater than 40.0% of mass 198	45.37 OK
	1 17.0 - 23.0% of mass 442	9.26 OK (20.40) #2
!		

5 point

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

#1 - Value in parenthesis is % mass 69. #2 - Value in parenthesis is % mass 442.

SAMILE ID LAB_ID DATE_OF_ANALYSIS_ _TI	ME_GF_ANALYSIS
150mg DETPP FCP TUN(>T1106 11/06/68 1 1	
1 SSTD STUCE 90388 1	11:00
	13:10
38012583.84 ack S0390	4:11
1 St 04.7572 AC 50391	5:11
18804358 AC 50392	11:01
138043585 AC 50343	17:10
\$8242580 AL 50394	5:09 1
81002537 AL 50395	4:08
13 0512547 my M S0396	30:08
150935171450 M. SO397	21:06
(SS013610 AC) SO398 S	19: 85 I
	13:04
	<u> </u>

another pet

File: -Tills Scan #: 85 Petn. time:	5.07
-------------------------------------	------

m/:	Int.	5/2	Into	m/z	Int.			m/z	Int.
43.10	3.353	85.20	1 144	127.05	62 307	176.95	1 232	222.90	1.46?
50 10	15.40	91.10		128.15		179.05		224.10	10.232
51.10	50.415	97 00		129.05		178.95		225.10	2.981
51 96	2.064	93 10	5.560	130.05	1.634	179.95	2.436	227.00	3.009
55.10	2.991	53.90	.717	132 15	1.261	180.95	1.204	244 00	8.627
56.10	2.178	96 90	_	134.85	1.605	185.05		244.90	.889
57.10	6.649	97.19	.974	135.05	1.634	185.95	11.579	245.90	1.347
63 10	1.777	98.10	3 497	136.95	1.003	187.05	2.981	255.00	38.005
65 00	1 548	95.00	4.242	141.05	2.264	188.15	1.863	256.00	4.64
67 20	1 318	101.00	2.436	142 05	1.433	192.05		257.90	2.264
69 CO	70.937	104 00	1.347	147.05	1.576	193.05		274.15	2.694
73.10	1 978	105.10	2.551	148.05	2.178	196.00		275.05	16.824
74 10	5.474	107 00	13.041	148.85	,774	198 00			2.064
75.10	8.865	103.00	2.350	155.05	1.204	199.00		277.05	1.490
76.10	2.995	109.00	1.146	157.05	•	204.10		295.95	4.185
77 16	55.632	116.00		158.85		205.00		322.95	1.490
78.10		111.00		159.95		206.10		334.05	1.089
79.10	4 013	116.00	.803	160.95	1.376	207.10		364.90	1.318
80.10	. 2.809	117 00	8.111	157.05	4.443	207.90		423.00	2.837
81.10	4.471	110 05	.917	167.95	2.293	211.00		441.05	6.220
92 10	1.092	123.15	1.748	171.05	, 974	217.00	5.904	442.05	45.371
83.1)	2.15%	124.05	.745	173.05	.745	221.00	6.363	443.05	9.258

Continuing Calibration Check HSL Compounds

Case Not	ed. int	ation Da	16'			
Contractor: Engineering - Sc	Time: 11:44					
Contract No:		Labora	tory ID:	>50	385	
Irstrument ID: 2	*****	Initia	l Calibr	atio	n Date:	10/12/51 200
Minimum RF for SFCC is	;	Maxim	um 2 Dif	f fo	r CCC	is %
Envocaco	RF	RF	2Diff	223	SPCC	
K-Hitroso-Dimethylamine	.90169	.97022	7.00			
2-Fluorephenel	1.15802	1.36759	18.68			
bis Z-Chloroethyl)ether	1.11892					
Phenal		1.60275		•		•
Pheno 1-d5	1.22488	1.50610	22.96			
Aniline	.54193	.57991	7.01			
2-Chlorophenol	1.23175	1.35064	9.65			
1,3-Dichlorotenzere	1.47535	1.45528	1.36			٠
1,4-Dichlorobenzene	1.40530	1.45988	3.88	•		•
Benzyi Chlorice	-	~	-			
	,72906					
1,2-Bichlorchenzene	1.32240	1.52645	15.43			
2-Methylphenol	1.17367	1.53010	30.37			
3-6-4-Methulphenal	1.07139	1.50450	40.42			
bis(2-chloreisopropyl)Ether	2.15627	2.67103	23.87			
N-Nitroso-Di-n-Propylamine		.93339			* *	
Hexach Toroethane	.53840	.59820	11.11			
Dibrowschieropropane	-	•	-			
Nitrobenzene	.40312	.41341	2.55			
Nitrobenzese-d5	.39137	,40011	2.23			
2-Nitrophenol	. 24657	. 26394	7.04	•		
Isopherone	.74170	.82949	11.83			
bis(2-Chioroethoxulmethame		.52280	5.86			
2.4-Dimeth. iphenci	. 34849	.38210	9.65			
Benzoic Acid	, 29725	. 32394	8.98			
2,4-Dicklorophenol	.56733	.56407	.57	•		
1,2,4-Trichlorobenzene	.36913	.32938	10.77			
Haphthalene	. 94589	.91662	3.10			
4-Chloreaniline	. 36309	.34801	4.15			
Hexachlorobutadiene	. 20283	.16403	19.13	ı		
4-Chloro-3-Methylphenol	.31360	.32956	5.09	•		
2-Metholinaphthalene	,56397	. 58648	3.99			

ķF - Average Response Factor from Initial Calibration Form VI

²⁰iff - % Difference from original average or curve

ECC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check HSL Compounds

Case No:	Calibration Date: 11/06/88				
Contractor: CHUNGERING- SIENGE	Time: 11:44				
Contract Nc:	Laboratory 10: >50388				
instrument ID: 4	Initial Calibration Date: 10/27/88 ——————————————————————————————————				
Minimum RF for SPCC is	Maximum % Diff for CCC is %				

Compound	RF	RF	₩Diff	CCC	SPCC
Hexachlorocyclopentadiene	. 29568	.29213	1.20		**
2.4.6-Trichiorophenel		.35898		ï	
2,4,5-Trichloropheno!	.52897				
2-Fluorobiphenyl		1.10407	13.22		
2-Chicronaphthalene		1.15459	6.73		
2-Natroan! line		49971	5.67		
Dimetnylphthalate	1.40629	1.35792	3.44		
2.6-Dinitrotoluene	.37415	.38299	2.36		
Acenaphthylene	1.68918	1.50243	5.73		
3-Nitroeniline	.4455?	.4843.	8.61		
2,4-Dinitrophencl	.11898	.13457	13.11		**
Acenaphthere	1.13011	, 98938	12.45	,	
Dibenzofuran	1.64131	1.50622	8.23		
2,4-Dinitrotoluene	.26418	.30629	7.78		
4-Nitrophenol	.28450	.28925	1.67		# X
Fluorene	1.12850	,96095	14.86		
Digthulphthalate	1.20939	1.15317	4.65		
4-Chloropheny i-phenylether	.59183	52781	10 82		
4-Nitroamiline	.35956	.34170	4.97		
2.4.5-Tribromophenel	,21023	.17772	15.46		
1.7-Diphenulrudrazine	-	-	-		
Alpha-EHC	-	•	-		
Beta-BHC	•	-	-		
Gamma-EHS	-	•	-		
Delta-BHű	•	-	-		
Heptachlor	-	-	-		
Aldrin	-	-	-		
N-Nitrosodiphenylamine	.40285	. 49637	23.21	•	
4,6-Dinitro-2-Methylphenol	.10514	-	-		
4-Bromopmenyl-phenylether	.21301	.22381	5.07		
Hexachlorobenzene	. 26273	.26592	1.21		
Pentachiorophenel	. 14536	.14450	.59	,	*

FF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

^{*}Diff - % Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Continuing Calibration Check HSL Compounds

Case No:	Calibration Date: 11/06/88					
Contract: CHUNKERING SIENIE	Time: 11:44					
Contract No:	Laboratory ID: >S0388					
instrument ID: 1	Initial Calibration Date: 10/43/88					

Minimut RF for SPIC is

Maximum & Diff for CCC is &

Compound	RF	RF	\Diff	000	SPCC
Phenanthrene	1.03431	1.02553	.85		
Anthracene	1.05155	1.19384	13.55		
Di-n-Butylphthalate	1.51956	1.89439	24.67		
4,4'-Dibromotiphenyl	•	•	•		
Fluoranthene	1.19047	1.22227	2.6?	5	
Heptachlor Epoxide	•	-	-		
Endosulfan I	•	-	-		
4.41-000	-	-	-		
Dielorin	•	-	-		
Enérin	-	•	-		
4,47-660	•	-	-		
Endos:lfar II	•	-	•		
Engrar Aldehyde	-	•	-		
4,4 -001	•	-	-		
Endosulfan Sulfate	•	-	-		
Dibutyloriorendate	•	•	-		
Benzidine	. 04023	.07609	89.13		
firene	1.56086	1.57500	.91		
Terphenyl-d14	1.05835	1.04103	1.64		
Butulbenzulonthalete	1.03390	1.17623	13.77		
3,3'-Dichlorobenzidise	.13689	. 22532	64.60		
Chrysene	.99655	1.06159	6.55		
Benzo: a) Anthracene	1.10407	1.12702	2.08		
bisf2-Ethylhexvl)Phthalate	1.21073	1.40986			
Di-n-octy!shthalate	3.40275	3.20518	5.81	¥	
Benzo.alPurens	1.32098	1.33824	1.31	•	
Benzo(b)Fluorenthene		1.41072			
Indenc(1.2.3-cd)furene		1.08629			
Dibenzo:a.h]Arthracene	. 27481				
Benzo(k)flucrarthene		1.45799	1		
Berzo(q,h,:)Pers lene		.95915			

kr - Kesponse Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

²Diff - 4 Difference from original average or curve

EEC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Sample No. (Standard): SSTDØGG Date Analyzed: 11/6/88	Lab Name	: Engineer	ng Science	£	Contract:	ORØQ	<u> </u>	•		
Lab File ID (standard): S0388 Time Analyzed: N/44 Instrument ID: ISI(DCB)			<u> </u>				Job No.:	<u> </u>		
Isl(DCB)	gmsZ	le No.(Stand	lard) : SST	DQC 16		Date 2	knalyzed:	11/6/88		
IS1 (DCB)	Lab File	Lab File ID (Standard): S0388 Time Analyzed: 11:49								
12 HOUR 738 9 9 266295 29 151029 1837	Instrume	nt ID: \	haaning gegen 1867 ^{arg}							
12 HOUR STD 738 9.29 266295 (2.91 151029 18.37 UPPER LIMIT 147638 9.29 332590 13.41 302058 18.87 LOWER LIMIT 36.900 8.79 133148 2.41 75515 17.87 EFA SAMPLE NO. 103 8643517 ALEA 6334 9.29 225792 13.00 12443 18.40 1103 8643517 ALEA 6337 9.29 225792 13.00 12443 18.40 1105 8643515 AL 66359 9.28 202027 12.53 11.2110 18.40 1105 8643515 AL 62359 9.28 202027 12.53 11.2110 18.40 1105 8643515 AL 62359 9.28 202027 12.53 11.2110 18.40 1105 8643515 AL 62359 9.28 202027 12.53 11.2110 18.40 1107 8643515 AL 62359 9.28 202027 12.53 11.2110 18.40 1107 8643515 AL 62359 9.28 202027 12.53 11.2110 18.40 1108 8643516 AL 72372 9.28 202027 12.53 11.2110 18.40 1108 8643616 BM 68421 9.29 201718 18.31 18.31 111 8643616 BM 68421 9.29 201718 18.31 18.31 112 123 11.4-11chlorobenzene-d4 10.29 11.4-12 18.31 121 122 11.4-11chlorobenzene-d4 10.29 11.4-12 12.31 122 123 11.4-11chlorobenzene-d4 10.29 11.4-12 12.31 123 123 11.4-11chlorobenzene-d4 10.29 11.4-12 12.31 124 125 127 12.31 11.4-12 11.4-12 125 127 12.31 11.4-12 11.4-12 11.4-12 126 127 12.31 11.4-12 11.4-12 11.4-12 127 128 11.4-12 11.4-12 11.4-12 128 129 11.4-12 11.4-12 11.4-12 129 11.4-12 11.4-12 11.4-12 120 121 11.4-12 11.4-12 11.4-12 121 122 11.4-12 11.4-12 11.4-12 122 123 11.4-12 11.4-12 11.4-12 123 124 124 124 124 124 124 124 124 125 127 128		1	IS1(DCB)		IS2(NPT)		[253 (ANT)	i		
STD			AREA #	RT	AREA #	RT	AREA #	RT		
LIMIT		, ,	73819	9.29	266295	12.91	151029	18.37		
LOWER 36940 8,79 133148 2.41 75515 17,87	-	LIMIT	147638	9.79	332590	13.41	302058	18.87		
STA SAMPLE NO.		LOWER	36910	8,79	133148	12.41	75515	17.87		
90 02 889387 M MARK		EFA SAMPLE			=========					
91 03 9809 2873 AL (66954 9.29 18287 13.00 124498 18.41 19.00 18.0		81042508 AL		9.27			' '	•		
## 05 \$60425 \(\frac{1}{2} \) AC \(\frac{1}{2} \) OS 9 \(\frac{1}{2} \) OS 2 \(\frac{1}{2} \) OS 3 \(\frac{1} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1} \) OS 3 \(\frac{1} \) OS 3 \(\frac{1}{2} \) OS 3 \(\frac{1}{2} \)	91 03	9809 2583 AL	66954			13.00	124498	18.41		
45 07 \$8093547 AC \$51567 \$9.31 \$18861 \$13.07 \$9.35 \$18.35 \$19.96 \$19.36 \$19.96 \$19.36 \$. 9105	88092585 AC	63059	9.28	202637	12.93	112116	18.40		
91 C = \$\(\chi_{\chi}\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi}\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi_{\chi}\}\chi}\chi_{\chi}\chi_{\chi}\}\chi_{\chi}\chi}\chi_{\chi}\chi_{\chi}\c	45 07	58092587 AC1	51567	9.31	182861	13.03	91252	18.39		
1	94 C 3 91 C =	SECH 2287 MENC!								
12 13 15 16 17 18 18 19 19 19 19 19 19	98 : :	85 09 3414 AC	72372	9.28		10.43				
15 15 16 17 18 18 19 19 19 19 19 19		88×13-010 BN	68421	9.09	217909	12.45	123270	- 18.43		
15 17 18 19 19 19 19 19 19 19	== ,	·								
15 17 18 19 19 19 19 19 19 19	14;							-		
IS 10 20 21 22 22 22 22 22 22 22 22 22 22 22 22	15									
IS1 (DOE) = 1,4-Dichlorobenzene-d4	17;									
IS1 (DOE) = 1,4-Dichlorobenzene-d4	15		[!			:			
IS1 (DCE) = 1,4-Dichlorobenzene-d4	20							-		
IS1 (DCE) = 1,4-Dichlorobenzene-d4	21:							:		
ISO (NFT) = Naphthalene-d8 internal standard area. ISO (NFT) = Acenaphthene-d8 LOWER LIMIT = - 50% of internal standard area.	IS1 /1	$\overline{CB}) = 1,4-5$	ichloroben	zene-d4	U	PER LI		is of		
internal standard area.	ISC (:	FT) = Napht	halene-d8		i:		standari a	723.		
	-3- [.	; = Acena	rntnene-d8				MI = = 50% standard 8	rea.		
William Used to tiad internal standard area values with at as as as as	# Cair	to beau am	flag inter	mal sta				steria''		

2178 FORM VIII SV-1

page __ cf __

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

				•	•,	•		,	
Albita ,		Lab Name	: Enginee	enna Scie	اد ه	Contract:	ORØ	<u> 41</u>	•
Affiliation this			•			SAS No.:		Job No.	:
policita di Calica q		Samp	le Nc.(Stand	iard): <u>SST</u>	ত্রকত		Date .	Analyzed:_	11/6/88
3		Lab File	ID (Standar	:d): <u>\$0</u>	388	-	Time .	Analyzed:_	11:44
on the state of th		Instrume	nt ID:						
s myrrywydytad	1			IS4(PHN) AREA #	•	ISS(CRY) AREA #		IS4(PRY) AREA #	RT
Eathlandelor a	1		12 HOUR STD	215211	23.03	159417	31.49	124024	37.71
d - age-many	1		UPPER LIMIT	430422	<i>93,53</i>	318834	31.99	248448	38.21
e.	}		LOWER LIMIT	107606	82.53	79709	30.99	62112	37,21
1	Ï		EP. SA!PLE NC.		=====	=======			
*		% 40 02 t	5842508 AC 88673888 MC BU4	161323	23.08 23.11	36695 94464	31,52	56963 58077¥	37.84 37.90
	MARIA	2 04 3 05	88042583 AL 88043584 AC 94043585 AC	167903 173286 148197	23.09 23.10 23.07	99752 100:711 87211	31.58 31.54 31.56	65590 68372 47886¥	37.86 37,78 32.83
		307	88042586 ACI 88042587 ACI	146648	23.09	13480d 76191 * 1087c7	31.58 31.55 31.56	77517 46900 * 74693	37.87
	,	4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	804256 WD AC	154800	23.03 23.07 23.13	103308 116578 87547	31,57	68181 56931 ¥ 489 0U	37.8C 37.65 37.75
	F	12 , 1 + ;							
,	11 11 11	15 15 17					***		
i				!					
-	1.5.37	22.							
echibilities code ,	(Laki)	IS5 (:	REN = Francis REN = Francis REN = Francis	incarens-di iens-dio .sas-dio	. 3	93 63 13	PER LIM inter WER LIM	al standa:	ri area.
Yes industries	THE PARTY	e Cali	.m. ussi to	flaş İnçar	nai sta	es est ista		with an a	
T-Companyor -	العندال	page c	: <u> </u>	21	79:: ::::	7722 57-2		•	10/0

10/86

This page intentionally left blank.

DATA PACKAGE #39

This page intentionally left blank.

RESEARCH AND DEVELOPMENT LABORATORY 600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 841-7353

REVISED REPORT

Job No.: OR001

Work Order No.: 881

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the soil sample(s) received by this laboratory on 8-19-88.

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
88081966	DANGB-BG-MW43-SS3	AS-F	8-18-88		10-06-88	
88081966	DANGB-BG-MW43-SS3	BA-I	8-18-88		9-19-88	
88081966	DANGB-BG-MW43-SS3	CD-F	8-18-88		9-19-88	
88081966	DANGB-BG-MW43-SS3	CR-F	8-18-88		9-19-88	
88081966	DANGB-BG-MW43-SS3	HG-C	8-18-88		9-13-88	
88081966	DANGB-BG-MW43-SS3	PB-F	8-18-88		10-11-88	
88081966	DANGB-BG-MW43-SS3	418.1	8-18-88	9-14-88	9-15-88	
88081966	DANGB-BG-MW43-SS3	MOIS	8-18-88		8-29-88	
88081966	DANGB-BG-MW43-SS3	8010	8-18-88		8-31-88	8-30-88
88081966	DANGB-BG-MW43-SS3	8020	8-18-88		8-31-88	8-31-88
88081966	DANGB-BG-MW43-SS3	8080	8-18-88	8-27-88	9-26-88	
88081966	DANGB-BG-MW43-SS3	8270	8-18-88	8-27-88	10-06-88	
88081967	DANGB-BG-MW43-SS1	AS-F	8-18-88		10-06-88	
88081967	DANGB-BG-MW43-SS1	BA-I	8-18-88		9-19-88	
88081967	DANGB-BG-MW43-SS1	CD-F	8-18-88		9-19-88	
88081967	DANGB-BG-MW43-SS1	CR-F	8-18-88		9-19-88	
88081967	DANGB-BG-MW43-SS1	HG-C	8-18-88		9-13-88	
88081967	DANGB-BG-MW43-SS1	PB-F	8-18-88		10-11-88	
88081967	DANGB-BG-MW43-SS1	418.1	8-18-88	9-14-88	9-15-88	
88081967	DANGB-BG-MW43-SS1	MOIS	8-18-88		8-29-88	
88081967	DANGB-BG-MW43-SS1	8010	8-18-88		8-31-88	8-30-88
88081967	DANGB-BG-MW43-SS1	8020	8-18-88		8-31-88	8-31-88
88081967	DANGB-BG-MW43-SS1	8080	8-18-88	8-27-88	9-26-88	
88081967	DANGB-BG-MW43-SS1	8270	8-18-88	8-27-88	10-06-88	

* If applicable

89-DULU0587 1

CL-FRM01

Work Order No.: 881

Project: Duluth ANGB

Sample Preparation Data

Laboratory	Client		Date	Date*	Date	Date*
Sample No.	Sample ID	Test	collected	extracted	analyzed	2nd col.
88081968	DANGB-BG-MW42-SS2	AS-F	8-18-88		10-06-88	
88081968	DANGB-BG-MW42-SS2	BA-I	8-18-88		9-19-88	
88081968	DANGB-BG-MW42-SS2	CD-F	8-18-88		9-19-88	
88081968	DANGB-BG-MW42-SS2	CR-F	8-18-88		9-19-88	
88081968	DANGB-BG-MW42-SS2	HG-C	8-18-88		9-13-88	
88081968	DANGB-BG-MW42-SS2	PB-F	8-18-88		10-11-88	
88081968	DANGB-BG-MW42-SS2	418.1	8-18-88	9-14-88	9-15-88	
88081968	DANGB-BG-MW42-SS2	MOIS	8-18-88		8-29-88	
88081968	DANGB-BG-MW42-SS2	8010	8-18-88		8-31-88	8-30-88
88081968	DANGB-BG-MW42-SS2	8020	8-18-88		8-31-88	8-31-88
88081968	DANGB-BG-MW42-SS2	8080	8-18-88	8-27-88	9-26-88	
88081968	DANGB-BG-MW42-SS2	8270	8-18-88	8-27-88	10-26-88	
88081969	DANGB-BG-MW43-SS2	AS-F	8-18 - 88		10-06-88	
88081969	DANGB-BG-MW43-SS2	BA-I	8-18-88		9-19-88	
88081969	DANGB-BG-MW43-SS2	CD-F	8-18-88		9-19-88	
88081969	DANGB-BG-MW43-SS2	CR-F	8-18-88		9-19-88	
88081969	DANGB-BG-MW43-SS2	HG-C	8-18-88	•	9-14-88	
88081969	DANGB-BG-MW43-SS2	PB-F	8-18-88		10-11-88	
88081969	DANGB-BG-MW43-SS2	418.1	3-18-88	9-14-88	9-15-88	
88081969	DANGB-BG-MW43-SS2	MOIS	8-18-88		8-29-88	
88081969	DANGB-BG-MW43-SS2	8010	8-18-88		8-31-88	8-30-88
88081969	DANGB-BG-MW43-SS2	8020	8-18-88		8-31-88	8-31-88
88081969	DANGB-BG-MW43-SS2	8080	8-18-88	8-27-88	9-26-88	
88081969	DANGB-BG-MW43-SS2	8270	8-18-88	8-27-88	10-26-88	
88081970	DANGB-BG-MW42-SS1	AS-F	8-18-88		10-06-88	
88081970	DANGB-BG-MW42-SS1	BA-I	8-18-88		9-19-88	
88081970	DANGB-BG-MW42-SS1	CD-F	8-18-88		9~19-88	
88081970	DANGB-BG-MW42-SS1	CR-F	8-18-88		9-19-88	
88081970	DANGB-BG-MW42-SS1	HG-C	8-18-88		9-14-88	
88081970	DANGB-BG-MW42-SS1	PB-F	8-18-88		10-11-88	
88081970	DANGB-BG-MW42-SS1	418.1	8-18-88	9-14-88	9-15-88	
88081970	DANGB-BG-MW42-SS1	MOIS	8-18-88		8-29-88	
88081970	DANGB-BG-MW42-SS1	8010	8-18-88		8-31-88	8-30-88
88081970	DANGB-BG-MW42-SS1	8020	8-18-88		8-31-88	8-31-88
88081970	DANGB-BG-MW42-SS1	8080	8-18-88	8-27-88	9-26-88	
88081970	DANGB-BG-MW42-SS1	8270	8-18-88	11-02-88	11-21-88	

^{*} If applicable

Work Order No.: 881

Project: Duluth ANGB

Sample Preparation Data

Polenia.							
	Laboratory	Client		Date	Date*	Date	Date*
	Sample No.	Sample ID	Test	collected	extracted	analyzed	2nd col.
regg	88081971	DANGB-BG-MW42-SS3	AS-F	8-18-88		10-06-88	
NAME OF THE PERSON OF THE PERS	88081971	DANGB-BG-MW42-SS3	BA-I	8-18-88		9-19-88	
	88081971	DANGB-BG-MW42-SS3	CD-F	8-18-88		9-19-88	
Ţ	88081971	DANGB-BG-MW42-SS3	CR-F	8-18-88		9-19-88	
Festile Afters	88081971	DANGB-BG-MW42-SS3	HG-C	8-18-88		9-14-88	
	88081971	DANGB-BG-MW42-SS3	PB-F	8-18-88		10-11-88	
7	88081971	DANGB-BG-MW42-SS3	418.1	8-18-88	9-14-88	9-15-88	
AND INCOME	88081971	DANGB-BG-MW42-SS3	MOIS	8-18-88		8-29-88	
2	88081971	DANGB-BG-MW42-SS3	8010	8-18-88		8-31-88	8-30-88
	88081971	DANGB-BG-MW42-SS3	8020	8-18-88		8-31-88	8-31-88
	88081971	DANGB-BG-MW42-SS3	8080	8-18-88	8-27-88	9-26-88	
1,000	88081971	DANGB-BG-MW42-SS3	8270	8-18-88	11-02-88	11-21-88	
	88081972	DANGB3-SS-EZ	AS-F	8-18-88		10-06-88	
į	88081972	DANGB3-SS-EZ	BA-I	8-18-88		9-19-88	
1	88081972	DANGB3-SS-EZ	CD-F	8-18-88		9-19-88	
1	88081972	DANGB3-SS-EZ	CR-F	8-18-88		9-19-88	
	88081972	DANGB3-SS-EZ	HG-C	8-18-88		9-14-88	
Park	88081972	DANGB3-SS-EZ	PB-F	8-18-88		10-11-88	,
ž	88081972	DANGB3-SS-EZ	418.1	8-18-88	9-14-88	9-15-88	
	88081972	DANGB3-SS-EZ	MOIS	8-18-88		8-29-88	
7	88081972	DANGB3-SS-EZ	8010	8-18-88		8-31-88	8-31-88
AND TO SOME	88081972	DANGB3-SS-EZ	8020	8-18-88		8-31-88	8-31-88
	88081972	DANGB3-SS-EZ	8080	8-18-88	8-27-88	9-26-88	
Sell.	88081972	DANGB3-SS-EZ	8270	8-18-88	8-27-88	11-28-88	
فالديا والأبا فالقاط فن	88081973	DANGB3-SS-DO	AS-F	8-18-88		10-06-88	
ર્દ	88081973	DANGB3-SS-DO	BA-I	8-18-88		9-19-88	
	88081973	DANGB3-SS-DO	CD-F	8-18-88		9-19-88	
Destrict media	88081973	DANGB3-SS-DO	CR-F	8-18-88		9-19-88	
indian •	88081973	DANGB3-SS-DO	HG-C	8-18-88		9-14-88	
	88081973	DANGB3-SS-DO	PB-F	8-18-88		10-11-88	
\$1.0k	88081973	DANGB3-SS-DO	418.1	8-18-88	9-14-88	9-15-88	
*1.0.00 MAN	88081973	DANGB3-SS-DO	MOIS	8-18-88		8-29-88	
~	88081973	DANGB3-SS-DO	8010	8-18-88		8-31-88	8-31-88
\$	88081973	DANGB3-SS-DO	8020	8-18-88		8-31-88	8-31-88
i songgagganti	88081973	DANGB3-SS-DO	8080	8-18-88	8-27-88	9-26-88	
3	88081973	DANGB3-SS-DO	8270	8-18-88	8-27-88	11-28-88	

* If applicable

89-DULU0587 3

CL-FRM01

Work Order No.: 881

Project: Duluth ANGB

Sample Preparation Data

Laboratory	Client		Date	Date*	Date	Date*
Sample No.	Sample ID	Test	collected	extracted	analyzed	2nd col.
88081974	DANGB3-SS-49	AS-F	8-18-88		10-06-88	
88081974	DANGB3-SS-49	BA-I	8-18-88		9-19-88	
88081974	DANGB3-SS-49	CD-F	8-18-88		9-19-88	
88081974	DANGB3-SS-49	CR-F	8-18-88		9-19-88	
88081974	DANGB3-SS-49	HG-C	8-18-88		9-14-88	
88081974	DANGB3-SS-49	PB-F	8-18-88		10-11-88	
88081974	DANGB3-SS-49	418.1	8-18-88	9-14-88	9-15-88	
88081974	DANGB3-SS-49	MOIS	8-18-88		8-29-88	
88081974	DANGB3-SS-49	8010	8-18-88		8-31-88	8-31-88
88081974	DANGB3-SS-49	8020	8-18-88		8-31-88	8-31-88
88081974	DANGB3-SS-49	8080	8-18-88	8-27-88	9-26-88	10-03-88
88081974	DANGB3-SS-49	8270	8-18-88	8-27-88	10-28-88	
88081975	DANGB3-SS-D1	AS-F	8-18-88		10-06-88	
88081975	DANGB3-SS-D1	BA-I	8-18-88		9-19-88	
88081975	DANGB3-SS-D1	CD-F	8-18-88		9-19-88	
88081975	DANGB3-SS-D1	CR-F	8-18-88		9-19-88	
88,081975	DANGB3-SS-D1	HG-C	8-18-88		9-14-88	
88081975	DANGB3-SS-D1	PB-F	8-18-88		10-11-88	
88081975	DANGB3-SS-D1	418.1	8-18-88	9-14-88	9-15-88	
88081975	DANGB3-SS-D1	MOIS	8-18-88		8-29-88	
88081975	DANGB3-SS-D1	8010	8-18-88		8-31-88	8-31-88
88081975	DANGB3-SS-D1	8020	8-18-88		8-31-88	8-31-88
88081975	DANGB3-SS-D1	8080	8-18-88	8-27-88	9-26-88	10-03-88
88081975	DANGB3-SS-D1	8270	8-18-88	11-02-88	11-21-88	
88081976	DANGB3-SS-EO	AS-F	8-18-88		10-06-88	
88081976	DANGB3-SS-EO	BA-I	8-18-88		9-19-88	
88081976	DANGB3-SS-EO	CD-F	8-18-88		9-19-88	
88081976	DANGB3-SS-EO	CR-F	8-18-88		9-19-88	
88081976	DANGB3-SS-EO	HG-C	8-18-88		9-14-88	
88081976	DANGB3-SS-EO	PB-F	8-18-88		10-11-88	
88081976	DANGB3-SS-EO	418.1	8-18-88	9-14-88	9-15-88	
88081976	DANGB3-SS-EO	MOIS	8-18-88		8-29-88	
88081976	DANGB3-SS-EO	8010	8-18-88		8-31-88	8-31-88
88081976	DANGB3-SS-EO	8020	8-18-88		8-31-88	8-31-88
88081976	DANGB3-SS-EO	8080	8-18-88	8-27-88	9-26-88	10-04-88
88081976	DANGB3-SS-EO	8270	8-18-88	11-02-88	12-01-88	

^{*} If applicable

Work Order No.: 881

Project: Duluth ANGB

Sample Preparation Data

Taylor.							
. S. S.	Laboratory	Client		Date	Date*	Date	Date*
	Sample No.	Sample ID	Test	collected	extracted	analyzed	2nd col.
黄	88081977	DANGB3-SS-E1	AS-F	8-18-88		10-06-88	
	88081977	DANGB3-SS-E1	BA-I	8-18-88		9-19-88	
	88081977	DANGB3-SS-E1	CD-F	8-18-88		9-19-88	
**	88081977	DANGB3-SS-E1	CR-F	8-18-88		9-19-88	
og garage	88081977	DANGB3-SS-E1	HG-C	8-18-88		9-14-88	
1975 1987	88081977	DANGB3-SS-E1	PB-F	8-18-88		10-11-88	
77	88081977	DANGB3-SS-E1	418.1	8-18-88	9-14-88	9-15-88	
eg eg	88081977	DANGB3-SS-E1	MOIS	8-18-88		8-29-88	
4	88081977	DANGB3-SS-E1	8010	8-18-88		8-31-88	8-31-88
	88081977	DANGB3-SS-E1	8020	8-18-88		8-31-88	8-31-88
F-sprig-	88081977	DANGB3-SS-E1	8080	8-18-88	8-27-88	9-26-88	
e e	88081977	DANGB3-SS-E1	8270	8-18-88	8-27-88	11-28-88	

* If applicable

89-DULU0587 5

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S): 88081966-88081977
WORK ORDER NO.: 881

These soil samples were received at the ES Berkeley Laboratory on 8-19-88.

They were received cold and intact.

89-DULU0588 1

CHAIN OF CUSTODY RECORD 881. /

formers framework framework the first framework framewor

THE PROPERTY OF

ALT DESCRIPTION

} *** ***

A CONTROLLED

Tuesday.

STATE STATE

ES JOB NO.	PROJECT NAME/LOCATION	WE/LOCATION		STIOS	ANALYSES / SHIP TO
OR001		Duluth ANGB/Duluth, Mn.	NO.		
SAMPLERIS	SAMPLER(S): (Signature)	Price Chapter	ō	<i>\</i>	///
ク 三				181	1/2/20
12/11	Jun 54/10.2000	93 2. 10 1. caldy	- K		
OATE TI	TIME	SAMPLE DESCRIPTION	TAINERS	OLOS WS SO OLOS WS SO OLOS WS	SKA SA SA SA SA SA SA SA SA SA SA SA SA SA
8/8/88 4.	140 DANGB-	8)8/88 4-14p DANGB-BF 1144+335 2324	_	2	881966
8118/68 3:	41PA 171106B-	8118/8 3:41/2 AMUCB-B(2-114443521 1.3.)	ノンシン	881967
8/18/88 13:19	19 DANGB-	DANGB-BG-MW42 652 73	,	777	881.968
8/16/88 3		DAMLB-BO- MW43 552 14-15	1	ノンノント	
3/18/88 13:15		DAN6B-BG-19W42 851 0-1	~		881970
8/18/84 13:55		DANGB-BO-MU/42 553 145-65	_	ノノノノノ	881971
8)18/82 13:19		DANG B - BO - MW42 551		7	89188
83/81/8	8)18/88 3 - 53th DAING B - BC	86 HW-13 552	~	/	69 5188
8/118/86 13:25		BANGB - Blo . Mouth 552	~	\ \	166188
8/16/68 13.13	_	BANG 13 - 136 - MAN 42 551	1		066138
10hith 85/81/8	- 1	DANG - MW 43 - 553	~	7	881966
Wait. 8 38/81/8		DANGB - BG MW 43	~	7	£96188
2					
J 8					
39					
Relinquishe	Relinquished by: (Signature)	Date/Time Received bys (Signs	ature)	Refinquished by: (Signature)	iure) Date/Time Received by: (Signature)
Deline	lun of Couring				
Relinquish.	Relinquished by: (Signature)	r Labo	retory by:	Date/Time Remarks	One des ser beclere Dayobs. 34. Muus
		• •		(Joe 7)	in 25 DANGB-BG-MW43
		and the state of the s	4,3	8-19-38 10:50 403 125	is year accounted for biff.

Distribution: Origins! Accompanies Shipment, Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD (1/2)

				~;
ES JOB NO.	PROJECT NAME/LOCATION		SOILS ANALYSES	SES / SHIP TO:
OR001	Duluth ANGB/Duluth, Mn.	Ö,	ME QUINE D	(a) / (c)
SAMPLER(S):	(a son	P.		600 Bancroft Way
flay tans	this (the Man Coll	CON-	1:6	Servered: Car. 54710
DATE TIME	¥S	TAINERS	STANS STANS SOOMS	REMARKS
8/12/88 1:Wpm	PANGB3SSE2	1		581972
3/18/8/3 11: 25mm	WIN DANGESSSOO		V V V V V	881973
8/18/88 11:00pm	bm D4N6B 355 49	_	1//////	381974
8/18/88 1:05pm	PAN BANGB355 EZ		77.77.7	881972
8/18/88 11: 45ar	a- DANGB 355 DI	1		881975
08:21 38/31/8	DAWGB 3SS ED	1	>	381.976
8/18/56 11:200	a DAMEB 3SS DO	1	>	881973
8/18/88 10:55	DANGB 355 49	1	7	881974
8/18/88 1:15	DANGB 3SS EI	,	77777	881977
8/11/88/11.20°	DANGE 355 DI	1	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	881975
8118/188 12:35	S DANG & 355 EO	-	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	881976
8/18/88 12:10	O DANGB 355 EI	~		281977
2				
J 9				
0				
Relinquished	Relinquished by: (Signature) Date/Time Received by: (Signa)	(ture)	Relinquished by: (Signature)	Date/Time Received by: (Signature)
Melinquished	Date/Time Received for Labor	atory hy:	Date/Time Remarks	
<u>. </u>	(Signature)		U 72.	٠,
	1 Bise I well	ł	8,19.88 10.32 Cleviers 50	by weats s.F.

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

2191

Control of the second of the s

THE PERSON IN

SAME SAME SA

Berger Brindeld . B

A STATE OF THE PERSON NAMED IN

ENGINEERING-SCIENCE INC. 12/13/88

PAGE 1

ANALYSIS REPORT

K ORDER NUMBER: 881

NUMBER : ZB0000003440

APPROVED BY Lab Supervisor

ORT DATA:

CAK RIDGE/DULUTH ANGB

K ORDER DATE : 08/19/88

S. ILLINOIS AVE. STE. S103

RIDGE, TN 37830

L HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

F REPORT COPIES: 1

TRACT / PO # : OROO1

TACT

: BILL HAYDEN

(615)-481-3920

K: 2, UNITS: mg/Kg

T COMPOUND	DANGE-BG-MW43 SS3 88081966	DANGB-BG-MW43- SS1 88081967	DANGB-BG-MW42- SS2 88081968	DANGB-BG-MW43- SS2 88081969	DANGB-BG-MW42 \$\$1 88081970	DANGB-BG-M-2- SS3 88081971
D DIG SOIL	NA	NA	NA	NA	NA	NA
ENIC	<5.0E	<5.0E	<5.0E	<5.0E	<5.0E	<5.0E
104	51.3	61.8	48.4	96.7*	69.7*	39.7*
HIUM	9.5N	7.6N	10.4N	13.6*N	11.5*N	10.1*א
MUINC	17.2	14.4	20.0	36.8	42.2	27.6
CURY	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
ס	4.2*N	5.1*N	3.6*N	4.7*N	4.9*N	3.4*N

NOT APPLICABLE

Not Detected

ANALYSIS REPORT FOR WORK ORDER NUMBER 881

SK: 2, UNITS: mg/Kg

	DANGB3-SS-ES	DANGB3-SS-DO	DANGB3-SS-49	DANG83-SS-D1	DANGB3-SS-EO	DANGB3-SS-E1
ST COMPOUND	88081972	88081973	88081974	88081975	88081976	88081977
ACID DIG SOIL	NA	NA	NA	NA	NA	NA
SENIC	<5.0E	<5.0E	<5.0E	<5.0E	<5.0E	<5.0E
RIUM	60.5*	104*	64.0*	43.1*	57.6*	98.7*
CADHIUM	11.0*N	11.9*N	11.2*N	10.4*N	11.5*N	9.43*N
<u> </u>	31.8	38.0	44.3	27.5	28.9	36.2
RCURY	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
LAD	6.5*N	6.0*N	16.8*N	4.0*N	5.7*N	10.2*N

NOT APPLICABLE

ANALYSIS REPORT

CORDER NUMBER: 881

NUMBER : ZB0000000440

CORDER DATE : 08/19/88

ORT DATA: JAK RIDGE/DULUTH ANGB

S. ILLINOIS AVE. STE. S103

RIDGE, TN 37830

_ HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

* REPORT COPIES: 1

TRACT / PO # : OR001

TACT

: BILL HAYDEN

(615)-481-3920

<: 3, UNITS: mg/Kg

T COMPOUND	DANGB-BG-MW43 SS3 88081966	DANGB-BG-MW43- SS1 88081967	SS2 88081968	DANGB-BG-MJ43- SS2 88081969	SS1 88081970	DANGB-BG-MW42- SS3 88081971
.1 PETROLEUM HYDROCARBONS	<100	200	<100	<100	<100	<100
DISTURE	14.0	29.3	11.3	17.2	15.6	9.1

ANALYSIS REPORT FOR WORK ORDER NUMBER 881

SK: 3, UNITS: mg/Kg

_	DANGB3-SS-E2	DANGB3-SS-DO	DANGB3-SS-49	DANG83-SS-D1	DANGB3-SS-EO	DANGB3-SS-E1
ST COMPOUND	88081972	88081973	88081974	88081975	88081976	8808*977
418.1 PETROLEUM HYDROCARBONS MOISTURE	100 9.8	<100 16.3	2700 10.6	<100 8.3	<100 8.1	<100 17.3

Transport ND - Not Detected

ENGINEERING-SCIENCE INC. 12/13/88

ANALYSIS REPORT

K ORDER NUMBER: 881

* NUMBER : ZB0000000440

APPROVED BY

K ORDER DATE : 08/19/88

ORT DATA:

CLIENT DATA:

OAK RIDGE, DULUTH ANGB 1 S. ILLINOIS AVE. STE. \$103 ES GAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

RIDGE, TN 37830

OAK RIDGE, TN 37830

L HAYDEN

F REPORT COPIES: 1

TRACT / PO # : OROO1

TACT

: BILL HAYDEN

(615)-481-3920

SK: 4, UNITS: ug/Kg, GROUP 8010

	DANGB-BG-MW43	DANGE-BG-MW43-	DANGE-BG-MW42-	DANGS-BG-MW43-	DANGE-BG-MW42-	DANGS-BG-MW42-
	\$\$3	SS1	SS2	SS2	SS1	\$23
-T COMPOUND	88081966	88081967	88081968	88081969	88081970	88081971
					**********	•••••
ZYL CHLORIDE	ND	ND	ND	ND	ND	ND
· (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND	ND
` (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND	GM
MOBENZENE	CM	ND	MD CW	ND	ND	ND
MODICHLOROMETHANE	ND	ND	ND	ND	ND	ND
XHOFORH .	ND	ND	ND	ND	ND	ND
MOETHANE	ND	ND	ND	ND	ND	ND
BON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
ORACETALDEHYDE	ND	ND	ND	ND	ND	ND
ORAL	GM	ND	ND	ND	MD CM	NC
OROBENZENE	ND	CA	DM	ND	ND	KO
OROETHANE	ND	ND	ND	ND	ND	CN
OROFORM	ND	ND	CM	0.126	ND	C.22B
'HLOROHEXANE	ND	ND	CM	ND	ND	CN
HLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
OROMETHANE	ND	ND	ND	ND	ND	КD
OROMETHYL METHYL ETHER	ND	ND	ND	ND	ND	ND
OROTOLUENE	ND	ND	ND	ND	ND	ND
ROHOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
ROMOMETHANE	ND	ND	ND	ND	ND	ND
2-DICHLOROBENZENE	ND	ND	ND	ND	ND	CM
I-DICHLOROGENZENE	ND	ND	ND	ND	ND	ND
-DICHLOROSENZENE	ND	ND	ND	ND	ND	CN
.HLOROD1FLUOROMETHANE	ND	ND	ND	ND	ND	ND
-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
'-DICHLOROE (HANE	ND	ND	ND	ND	ND	ND
-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
NS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
HLOROMETHANE	7.48	3.1B	0.298	4.8B	1.3B	2.2B
-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND

⁻ Not Detected

PAGE 6

ENGINEERING-SCIENCE INC. 12/13/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 881

TEST COMPOUND	DANGB-BG-MW43 SS3 88081966	DANGB-BG-MW43- SS1 88081967	DANGB-BG-MW42- SS2 88081968	DANGB-BG-MV43- SS2 88081969	DANGB-BG-พพ-2- SS1 88081970	DANGE-EG-MW42- SS3 88081971
4.44		•	• • •			
3.DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
TRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND
ື່າ;1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
ICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
I CHLOROFLUOROMETHANE	ND	ND	ND	ND	ND	ND
TRICHLOROPROPANE	ND	ND	ND	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND

ND - Not Detected

PAGE 7

ENGINEERING-SCIENCE INC. 12/13/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 881

<: 4, UNITS: Ug/Kg, GROUP 8010

	DANGB3-SS-E2	DANGE3-SS-DO	DANGB3-SS-49	DANGB3+SS-D1	DANGB3-SS-EO	DANGB3-SS-E1
T COMPOUND	88081972	88081973	88081974	88081975	88081976	88051977
ZYL CHLORIDE	ND	ND	ND	ND	ND	ND
(2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND	ND
(2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND	ND
HOBENZENE	ND	ND	NC	ND	ND	ND
HODICHLOROMETHANE	ND	ND	ND	ND	ND	ND
4OFORM	ND	ND	ND	ND	ND	ND
HOETHANE	ND	ND	ND	ND	ND	ND
BON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
ORACETALDEHYDE	ND	ND	ND	ND	ND	ND
ORAL	ND	ND	ND	ND	ND	ND
OROBENZENE	ND	ND	ND	ND	ND	ND
DROETHANE	ND	ND	ND	ND	ND	ND
OROFORM	0.23B	ND	0.30B	ND	ND	ND
HLOROHEXANE	ND	ND	ND	ND	ND	ND
HLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
OROMETHANE	ND	ND	ND	ND	ND	ND
OROMETHYL METHYL ETHER	ND	ND	ND	ND	ND	ND
OROTOLUENE	ND	ND	ND	ND	ND	ND
ROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
ROMOMETHANE	ND	ND	ND	ND	ND	ND
-DICHLOROBENZENE	ND	ND	ND	ND	ND	CN
-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
-DICHLOROSENZENE	ND	ND	ND	ND	ND	ND
HLOROD I FLUOROMETHANE	ND	ND	ND	ND	ND	ND
-DICHLORDETHANE	NO	ND	1.2	ND	ND	ND
-DICHLORDETHANE	NO GN	ND	ND	ND	МÐ	ND
-DICHLORGETHYLENE	ND	ND	ND	ND CM	ND	CM
NS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND	ND
HLOROMETHANE	1.3B	1.38	2.48	1.4B	1.4B	3.58
-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND
-DICHLOROPROPYLENE	ND	ND	ND	ND	ND	ND
,2,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
,1,2-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
RACHLOROETHYLENE	ND	ND	378	ND	ND	ND
,1-TRICHLOROETHANE	ND	ND	4.5B	ND	ND	ND
,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
CHLOROETHYLENE	ND	4.4	0.73	ND	ND	ND
CHLOROFLUOROMETHANE	ND	ND	ND	ND	ND	ND
CHLOROPROPANE	ND	ND	ND	ND	ND	ND
YL CHLORIDE	ND	ND	ND	ND	ND	ND
				,	ne .	HP.

⁻ Not Detected

ENGINEERING-SCIENCE INC. 12/13/88 PAGE 8

ANALYSIS REPORT

ORK ORDER NUMBER: 881

#38 NUMBER : ZB00000003-0
WORK ORDER DATE : 08/19/88

APPROVED BY

t ab Company

PORT DATA:

ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

K RIDGE, TH 37830

LL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)
710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

En Signature Commission Commissio

OF REPORT COPIES: 1

LONTRACT / PO # : OROD1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: Ug/kg, GROUP 8020

TEST COMPOUND	DANGB-BG-MW43 SS3 88081966	DANGB-BG-MW43- SS1 88081967	DANGE-BG-MW42- SS2 88081968	DANGB-85-MW43- SS2 88081969	DANGB-BG-MW42- SS1 88081970	DANGB-BG-MW42* SS3 88081971
. INZENE	ND	ND	ND	ND	ND	ND
LILOROBENZENE	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
4-DICHLOROBENZENE	ND	ND	ND	ND	C۸	ND
ETHYL BENZENE	ND	ND	ND	ND	ND	ND
TOLUENE	160B	25B	ND	8.3B	1.88	1986
LENES	ND	ND	ND	ND	ND	ND

- Not Detected

2199

a Official a

Section 1

ANALYSIS REPORT FOR WORK ORDER NUMBER 881

K: 4, UNITS: ug/Kg, GROUP 8020

• 1	DANGB3-SS-E2	DANGB3-SS-DO	DANGB3-SS-49	DANGE3-SS-D1	DANGB3-SS-EO	DANGB3-SS-E1
T COMPOUND	88081972	88081973	88081974	88081975	88081976	88081977
ZENE	ND	ND	900	ND	ND	ND
OROBENZENE	ND	ND	ND	ND	ND	ND
-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
-DICHLOROBENZENE	ND	ND	ND	ND	Ю	ND
-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND
YL BENZENE	ND	ND	260	ND	ND	ND
UENE	388	208	1300B	12B	3.1B	53B
ENES	ND	ND	2000	ND	ND	ND

⁻ kot Detected

PAGE 10

ANALYSIS REPORT

3K ORDER NUMBER: 881

WORK ORDER DATE : 08/19/88

APPROVED BY

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. \$103

C RIDGE, TN 37830

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

4 OF REPORT COPIES: 1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: Ug/Kg, GROUP 8080

TEST COMPOUND	DANGB-BG-MW43 \$\$3 88081966	DANGB-BG-MW43- SS1 88081967	DANGB-BG-MW42- SS2 88081968	DANGE-BG-MW43- \$\$2 88081969	DANGB-BG-MW42- SS1 88081970	DANGS-BG-MW-2- \$\$3 88081971
PIN (PRIN	ND	ND	ND	ND	ND	ND _
Ã	ND	ND	ND	ND	ND	ND -
SETA-BHC	ND	ND	ND	ND	ND	ND
g .TA-BHC	ND	ND	ND	ND	ND	ND
र्ढू 4MA-BHC	ND	ND	ND	ND	ND	ND
ĆHLORDANE	ND	ND	ND	ND	ND	ND
4,41-DDD	ND	ND	ND	ND	ND	ND
हैं भ -DDE	ND	ND	ND	ND	ND	ND
₹ 1°-DDT	ND	ND	ND	ND	ND	ND
DIELDRIN	ND	ND	ND	ND	ND	ND
ENDOSULFAN I	ND	ND	ND	ND	ND	ND
OSULFAN II	ND	ND	ND	ND	ND	ND
É.JOSULFAN SULFATE	ND	ND	ND	ND	ND	ND
ENDRIN	ND	ND	ND	ND	ND	ND
<u> </u>	NA	NA	NA	NA	NA	NA
5	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
	NA	NA	NA	NA	NA	NA
#	ND	ND	ND	ND	ND	ND
· ·	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
	ND	ND	KD	ND	ND	ND
	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
着 3-1260	ND	ND	ND	ND		ND

WA- NOT ANALYZED NOT Detected

ENGINEERING-SCIENCE INC. 12/13/88

PAGE 11

ANALYSIS REPORT FOR WORK ORDER NUMBER 881

K: 4, UNITS: ug/Kg, GROUP 8080

•	DANGB3-SS-E2	DANGE3-SS-DO	DANGB3-SS-49	DANGB3-SS-D1	DANGB3-SS-EO	DANGB3-SS-E1
T COMPOUND	88081972	88081973	88081974	88081975	88081976	88081977
RIN	ND	ND	ND	ND	ND	ND
HA-BHC	ND	ND	ND	ND	ND	ND
A-BHC	ND	ND	ND	ND	ND	ND
TA-BHC	ND	ND	ND	ND	ND	ND
4A-BHC	ND .	ND	ND	ND	NO	ND
ORDANE	ND	ND	ND	ND	ND	ND
1-000	ND	ND	190	62	ND	ND
'-DDE	ND	ND	ND	ND	ND	ND
'-DDT	ND	ND	45	51	25	ND
LDRIN	ND	ND	ND	ND	ND	ND
OSULFAN I	ND	ND	ND	ND	ND	ND
OSULFAN II	ND	ND	ND	ND	ND	ND
OSULFAN SULFATE	ND	ND	ND	ND	ND	ND
RIN	ND	ND	ND	ND	ND	ND
RIN ALDEHYDE	NA	NA	NA	NA	NA	NA
TACHLOR	ND	ND	ND	ND	ND	ND
TACHLOR EPOXIDE	ND	ND	ND	ND	ND	ND
ONE	NA	NA	NA	NA	NA	KA
HOXYCHLOR	ND	ND	ND	ND	ND	ND
APHENE	ND	ND	ND	ND	ND	ND
÷1016	ND	ND	ND	ND	ND	ND
-1221	ND	ND	GM	ND	ND	ND
-1232	ND	ND	ND	ND	ND	ND
-1242	ND	ND	ND	ND	ND	ND
-1248	ND	ND .	ND	ND	ND	ND
-1254	ND	ND	ND	ND	ND	ND
-1260	ND	ND	ND	ND	ND	ND

⁻ NOT ANALYZED

⁻ Not Detected

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received: August 19, 1988 Work Order: 881
Date Reported: December 6, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

obeininkindikingan basantanapagi intor ocasbasahosashinganapaganapaganapaganapaganapaganapaganapaganapaganapag

Lab Number:	88081966	88081967
Sample No.:	DANGB-BG-MW43-	DANGB-BG-MW43-
Sample No.:	SS3 23-24'	SS1 1-2'
Date Sampled:	8-18-88	8-18-88
Time Sampled:	16:14	15:41
Date Extracted:	8-27-88	8-27-88
Time Sampled: Date Extracted: Date Analyzed:	10-6-88	10-6-88
Percent Moisture:	14	29

Compound	Detection Limits	ANALYTICAL RESULTS (dry weight)		
	ug/kg	ug/kg	ug/kg	
1,3-Dichlorobenzene	330	ND	ND	-
1,4-Dichlorobenzene	330	ND	ND	
Hexachloroethane	330	ND	ND	
Bis(2-chloroethyl)ether	330	ND	ND	
1,2-Dichlorobenzene	330	ND	ND	
N-Nitrosodimethylamine	330	ND	ND	
Bis(2-chloroisopropyl)ethe	r 330	ND	ND	
N-Nitrosodi-n-propylamine	330⋅	ND	ND	
#Hexachlorobutadiene	330	ND	ND	
1,2,4-Trichlorobenzene	330	ND	ND	
Nitrobenzene	330	ND	ND	
₃ -Isophorone	330	ND	ND	
Naphthalene	330	ND	ND	
Bis(2-chloroethoxy)methane	330	ND	ND	
2-Chloronaphthalene	330	ND	ND	
#Hexachlorocyclopentadiene	330	ND	ND	
Acenaphthylene	330	ND	ND	
Acenaphthene	330	ND	ND	
2-Dimethyl phthalate	330	ND	ND	
2,6-Dinitrotoluene	330	ND	ND	
Fluorene	330	ND	ND	
2,4-Dinitrotoluene	330	ND	ND	
Diethyl phthalate	330	ND	ND	
N-Nitrosodiphenylamine	330	ND	ND	
Hexachlorobenzeme	330	ND	ND	

B = Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: August 19, 1988 Work Order: 881 ate Reported: December 6, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

idress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081966	88081967
ample No.:	DANGB-BG-MW43-	DANGB-BG-MW43-
	SS3 23-24'	SS1 1-2'
ate Sampled:	8-18-88	8-18-88
ime Sampled:	16:14	15:41
ate Extracted:	8-27-88	8-27-88
ate Analyzed:	10-6-88	10-6-88
ercent Moisture:	14	29

ompound	Detection Limits		AL RESULTS veight)	
	ug/kg	ug/kg	ug/kg	
henanthrene	330	ND	ND	
nthracene	330	ND	ND	
ibutyl phthalate	330	ND	ND	
luoranthene	330	ND	ND	
-Chlorophenyl phenyl ethe	r 330	ND	ND	
yrene	330	ND	ND	
utyl Benzyl phthalate	330	ND	ND	
is(2-ethylhexyl) phthalat	e 330	ND	ND	
hrysene	330	ND	ND	
-Bromophenyl phenyl ether	330	ND	ND	
enzo(a)anthracene	330	ND	ND	
i-n-octylphthalate	330	· ND	ND	
enzo(b)fluoranthene	330	ND	ND	
enzo(k)fluoranthene	330	ND	ND	
e nzidine	2000	ND	ND	
,3'-Dichlorobenzidine	660	ND	ND	
enzo(a)pyrene	330	ND	ND	
ndeno(1,2,3-cd)pyrene	330	ND	ND	
<pre>ibenzo(a,h)anthracene</pre>	330	ND	ND	
enzo(ghi)perylene	330	ND	ND	
enzyl Alcohol	660	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 19, 1988 Work Order: 881 Tate Reported: December 6, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden ES:Oak Ridge/Duluth ANGB

ddress: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

Lab Number: ample No.:	88081966 DANGB-BG-MW43- SS3 23-24'	88081967 DANGB-BG-MW43- SS1 1-2'
Date Sampled:	8-18-88	8-18-88
ime Sampled:	16:14	15:41
ime Sampled: Late Extracted:	8-27-88	8-27-88
Date Analyzed:	10-6-88	10-6-88
percent Moisture:	14	29

Compound	Detection Limits	Analytical Results (dry weight)	
e outre establis	ug/kg	ug/kg	ug/kg
Acetophenone	*	ND	ND
<u>Finiline</u>	*	ND	ND
-Aminobiphenyl	*	ND	ND
4-Chloroaniline	660	ND	ND
21-Chloronaphthalene	*	ND	ND
)ibenzofuran	330	ND	ND
p-Dimethylaminoazobenzene	*	ND	ND
7,12-Dimethy_benz(a)anthra	cene*	ND	ND
<pre>!-,a-Dimethylphenethylamir</pre>	e*	ND	ND
iphenylamine	*	ND	ND
1,2-Diphenylhydrazine	*	ND	ND
:Tthyl methanesulfonate	*	ND	ND
}-Methylcholanthrene	*	ND	ND
'Methyl methanesulfonate	*	ND	ND
, 2-Methylnaphthalene	330	ND	ND
Naphthylamine	*	ND	ND
[‡] 2-Naphthylamine	*	ND	ΝD
2-Nitroaniline	1600	ND	ND
∛}-Nitroaniline	1600	ND	ND
1-Nitroaniline	1600	ND	ND
N-Nitroso-di-n-butylamine	*	ND	ND
∛N-Nitrosopiperidine	~~*	ND	ND
entachlorobenzene '	*	ND	ND
*Pentachloronitrobenzene	*	ND	ND
_Phenacetin	*	ND	ND
2-Picoline	 ★	ND	ND
Pronamide	*	ND	ND
1,2,4,5-Tetrachlorobenzene	>	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

ate Received: August 19, 1988 Work Order: 881 ate Reported: December 6, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081966	88081967
ample No.:	DANGB-BG-MW43-	DANGB-BG-MW43-
-	SS3 23~24'	SS1 1-2'
ate Sampled:	8-18-88	8-18-88
ime Sampled:	16:14	15:41
ate Extracted:	8-27-88	8-27-88
ate Analyzed:	10-6-88	10-6-88
ercent Moisture:	14	29

ompound	Detection Limits		CAL RESULTS weight)
	ug/kg	ug/kg	ug/kg
lpha-BHC	x	ND	ND
amma-BHC	*	ND	ND
eta-BHC	660	ND	ND
eptachlor	330	ND	ND
elta-BHC	500	ND	ND
ldrin	330	ND	ND
eptachlor epoxide	330	ND	ND
ndosulfan I	*	ND	ND
ieldrin	500	ND	ND
,4'-DDE	1000	ND	ND
ndrin	* ·	ND	ND
ndosulfan II	*	'ND	ND
, 4 ' -DDD	500	ND	ND
,4'-DDT	830	ND	ND
ndosulfan Sulfate	1000	ND	ND
ndrin aldehyde	*	ND	ND
ndrin Ketone	*	ND	ND
nlordane	2000	ND	ND
ethoxychlor	~-*	ND	ND
oxaphene	2000	ND	ND
roclor-1016	2000	ND	ND
roclor-1221	2000	ND	ND
roclor-1232	2000	ND	ND
roclor-1242	2000	ND	ND
roclor-1248	2000	ND	ND
roclor-1254	2000	ND	ND
roclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: August 19, 1988
Date Reported: December 6, 1988

おいません いいいかんしゅうしゃくしゃ

Work Order: 881 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

#Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081966	88081967
Sample No.:	DANGB-BG-MW43-	DANGB-BG-MW43-
	SS3 23-24'	SS1 1-2'
<pre>To ate Sampled:</pre>	8-18-88	8-18-88
To Sampled: Time Sampled:	16:14	15:41
Date Extracted:	8-27-88	8-27-88
aDate Analyzed:	10-6-88	10-6-88
Date Analyzed: Percent Moisture:	14	29

Compound	Detection Limits		L RESULTS veight)	
4.	ug/kg	ug/kg	ug/kg	
2-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
Phenol	330	ND	ND	
2.4-Dimethylphenol	330	ND	ND	
2,4-Dichlorophenol	330	ND	ND	
2,4-Dimethylphenol 2,4-Dichlorophenol 2,4,6-Trichlorophenol	330	ND	ND	
4-Chloro-3-methylphenol	660	ND	ND	
2,4-Dinitrophenol	1600	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
2-Methyl-4,6-Dinitrophenol	1600	ND	ND	
<pre>?entachlorophenol</pre>	1600	ND	ND	
4-Nitrophenol	1600	ND	ND	
Benzoic Acid	1600	ND	ND	
, 2-Methylphenol	330	ND	ND	
3- & 4-Methylphenol	330	ND	ND	
2,3,4,6-Tetrachlorophenol	*	ND	ND	
2,4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

3 = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Meutrals - SW 8270 Matrix: Soil

te Received: August 19, 1988 Work Order: 881 te Reported: December 6, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

lress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081968	88081969
aple No.:	DANGB-BG-MW42-	DANGB-BG-MW43-
	SS2 7-8'	SS2 14-15'
te Sampled:	8-18-88	8-18-88
ne Sampled:	13:19	15:53
te Extracted:	11-2-88	8-27-88
te Analyzed:	11-21-88	10-26-88
cent Moisture:	11	17

apound	Detection Limits		AL RESULTS veight)
	ug/kg	ug/kg	ug/kg
3-Dichlorobenzene	330	ND	ND
i-Dichlorobenzene	330	ND	N D
kachloroethane	330	ND	ND
<pre>5(2-chloroethyl)ether</pre>	330	ND	ND
2-Dichlorobenzene	330	ND	ND
Vitrosodimethylamine	330	ND	ND
3(2-chloroisopropyl)eth	er 330	ND	ND
Vitrosodi-n-propylamine	330	ND	ND
kachlorobutadiene	330	ND	ND
1,4-Trichlorobenzene	330	ND	ND
crobenzene	330	ND	ND
ophorone	330	ND	ND
>hthalene	330	ND	ND
<pre>5(2-chloroethoxy)methan</pre>	e 330	ND	ND
Chloronaphthalene	330	ND	ND
kachlorocyclopentadiene	330	ND	ND
∍naphthylene	330	ND	ND
enaphthene	330	ND	ND
nethyl phthalate	330	ND	ND
5-Dinitrotoluene	330	ND	ND
lorene	330	ND	ND
i-Dinitrotoluene	330	ND	ND
∍thyl phthalate	330	ND	ND
√itrosodiphenylamine	330	ND	ND
<achlorobenzene< td=""><td>330</td><td>ND</td><td>ND</td></achlorobenzene<>	330	ND	ND

⁻ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

The Received: August 19, 1988 Work Order: 881 December 6, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden

R: ES:Oak Ridge/Duluth ANGB Allress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Jample No.:	88081968	88081969
Sample No.:	DANGB-BG-MW42-	DANGB-BG-MW43-
5	SS2 7-8'	SS2 14-15'
Tte Sampled:	8-18-88	8-18-88
Name Sampled:	13:19	15:53
Date Extracted:	11-2-88	8-27-88
可能 Analyzed:	11-21-88	10-26-88
Pircent Moisture:	11	17

Compound D	etection Limits	ANALYTICAL (dry wei		
<u>.</u>	ug/kg	ug/kg	ug/kg	
enanthrene	330	ND	ND	
¼ thracene	330	ND	ND	
Dibutyl phthalate	330	ND	ND	
Taguoranthene	330	ND	ND	
Chlorophenyl phenyl ether	330	ND	ND	
Pyrene	330	ND	ND	
ತ್ತೀtyl Benzyl phthalate	330	ND	ND	
3 s(2-ethylhexyl) phthalate	330	ND	ND	
Dirysene	330	ND	ND	
1-Bromophenyl phenyl ether	330	ND	ND	
∄ nzo(a)anthracene	330	ND	ND	
-n-octylphthalate	330	ND	ND	
3enzo(b)fluoranthene	330	ND	ND	
🗟 nzo(k)fluoranthene	330	ND	ND	
nzidine	2000	ND	ND	
3,3'-Dichlorobenzidine	660	ND	ND	
aenzo(a)pyrene	330	ND	ND	
deno(1,2,3-cd)pyrene		ND	ND	
J.benzo(a,h)anthracene	330	ND	ND	
3enzo(ghi)perylene	330	ND	ND	
nzyl Alcohol	660	ND	ND	

³⁻⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

te Received: August 19, 1988 te Reported: December 6, 1988 Work Order: 881 Job Number: OR001

c: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

nple No.:	88081968 DANGB-BG-MW42- SS2 7-8'	88081969 DANGB-BG-MW43- SS2 14-15'
te Sampled:	8-18-88	8-18-88
ne Sampled:	13:19	15:53
te Extracted:	11-2-88	8-27-88
te Analyzed:	11-21-88	10-26-88
rcent Moisture:	11	17
	. بين ملك فين بين جام يت مله غيث فت التي بين بنام يت مله فت ياد؟ 45 بين، == == منه شد غلت كنا	

mpound	Detection Limits		al Results weight)
	ug/kg	ug/kg	ug/kg
<pre>stophenone</pre>	*	ND	ND
iline	*	ND	ND
Aminobiphenyl	×	ND	ND
Chloroaniline	660	ND	ND
Chloronaphthalene	~-*	ND	ND
penzofuran	330	ND	ND
Dimethylaminoazobenzen	e*	ND	ND
12-Dimethylbenz(a)anth	racene*	ND	ND
,a-Dimethylphenethylam	ine*	ND	ND
phenylamine	*	ND	ND
2-Diphenylhydrazine	*	ND	ND
ayl methanesulfonate	*	ND	ND
Methylcholanthrene	~-*	ND	ND
thyl methanesulfonate	*	ND	ND
Methylnaphthalene	330	ND	ND
Vaphthylamine	*	ND	ND
Vaphthylamine	*	ND	ND
Vitroaniline	1600	ND	ND
Nitroaniline	1600	ND	ND
Nitroaniline	1600	ND	ND
Nitroso-di-n-butylamin	e*	ND	ND
Nitrosopiperidine	*	ND	ND
ntachlorobenzene	*	ND	ND
ntachloronitrobenzene	*	ND	ND
enacetin	*	ND	ND
Picoline	*	ND	ND
onamide	~-*	ND	ND
2,4,5-Tetrachlorobenze	ne*	ND	ND

EPA has not yet determined detection limits for these compounds.

E Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Work Order: 881 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

inple No.:	88081968	88081969
imple No.:	DANGB-BG-MW42-	DANGB-BG-MW43-
	SS2 7-8'	SS2 14-15'
<pre>2ate Sampled:</pre>	8-18-88	8-18-88
ime Sampled: Sate Extracted:	13:19	15:53
Jate Extracted:	11-2-88	8-27-88
Date Analyzed:	11-21-88	10-26-88
Frcent Moisture:	11	17

Compound er	Detection Limits		ICAL RESULTS y weight)
The second secon	ug/kg	ug/kg	ug/kg
<u>llpha-BHC</u>	*	ND	ND
amma-BHC	*	ND	ND
ತ್ತೇta−BHC	660	ND	ND
deptachlor	330	ND	ND
∰`∍lta-BHC	500	ND	ND
E ldrin	330	ND	ND
Heptachlor epoxide	330	ND	ND
andosulfan I	 *	ND	ND
.eldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
Sndrin	*	ND	ND
idosulfan II	*	ND	ND
₫ ., 4 ' − DDD	500	ND	ND
1,4'-DDT	830	ND	ND
🖥 ıdosulfan Sulfate	1000	ND	ND
drin aldehyde	*	ND	ND
Endrin Ketone	*	ND	ND
<u> </u>	2000	ND	ND
i ⇒thoxychlor	~-*	ND	ND
roxaphene	2000	ND	ND
Aroclor-1016	2000	ND	ND
oclor-1221	2000	ND	ND
_oclor-1232	2000	ND	ND
Aroclor-1242	2000	ND	ND
≟roclor-1248	2000	ND	ND
1:oclor-1254	2000	ND	ND
Troclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

^{3 =} Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

te Received: August 19, 1983 te Reported: December 6, 1988 Work Order: 881 Job Number: OR001

RES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

lress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Number:	88081968	88081969
aple No.:	DANGB-BG-MW42-	DANGB-BG-MW43-
	SS2 7-8'	SS2 14-15'
ce Sampled:	8-18-88	8-18-88
ne Sampled:	13:19	15:53
ce Extracted:	11-2-88	8-27-88
te Analyzed:	11-21-88	10-26-88
ccent Moisture:	11	17

npound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
Chlorophenol	330	ND	ND ND	
Jitrophenol	330	ND	ND	
enol	330	ND	ND	
1-Dimethylphenol	330	ND	ND	
i-Dichlorophenol	330	ND	ND	
1,6-Trichlorophenol	330	ND	N D	
Chloro-3-methylphenol	660	ND	ND	
1-Dinitrophenol	1600	ND	ND	
3-Dichlorophenol	*	ND	ND	
1ethyl-4,6-Dinitrophenol	. 1600	ND	, ND	
ıtachlorophenol	1600	ND	ND	
litrophenol	1600	ND	ND	
nzoic Acid	1600	ND	ND	
1ethylphenol	330	ND	N D	
& 4-Methylphenol	330	ND	ND	
3,4,6-Tetrachlorophenol	*	ND	ND	
i,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

[:] Compound was detected in the blank.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Pate Received: Work Order: 881 August 19, 1988 Job Number: OR001 Date Reported: December 6, 1988

Address: ATTN: Mr. Bill Hayden ES:Oak Ridge/Duluth ANGB

710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830

The state of the s

-		
Lab Number:	88081970	88081971
Frample No.:	DANGE-BG-MW42-	DANGB-BG-MW42-
mample No.:	SS1 0-1'	\$53 14.5-15.5'
Date Sampled:	8-18-88	8-18-88
Fime Sampled:	13:15	13:25
ipate Extracted:	11-2-88	11-2-88
Time Sampled: Date Extracted: Date Analyzed:	11-21-88	11-21-88
Percent Moisture:	16	9

Lompound			CAL RESULTS weight)	
	ug/kg	ug∕kā (dry w	uā/kā	
1,3-Dichlorobenzene	330	NE)	ND	
_1,4-Dichlorobenzene	330	ND	ND	
Hexachloroethane	330	ND	ND	
∄3is(2-chloroethyl)ether	330	ND	ND	
1,2-Dichlorobenzene	330	ND	ND	
[:-Nitrosodimethylamine	330	ND	ND	
過滤に(2-chloroisopropyl)ethe	r 330	ND	ND	
K-Nitrosodi-n-propylamine	330	NDs	NE)	
# Hexachlorobutadiene	330	ND	ND	
1.,2,4-Trichlorobenzene	330	ND	ND	
*Kitrobenzene	330	CN	ND	
Isophorone	030	ND	ND	
🤹 Kaphi halene	336	$N\Gamma$	ND	
Lis(2-chloroethoxy)methane	330	NI)	, ND	
2-Chloronaphthalene	330	ND_{λ}	ND	
#Hexachlorocyclopentadiene	330	ND	ND	
1 4cenaphthylene	330	ND	ND	
Acenaphthene	330	ND	ND	
Dimethyl phthalate	330	ND	ND	
₹2,6-Dinitrotoluene	330	ND	ND	
[‡] fluoren e	330	ND	ND	
2,4-Dinitrotoluene	330	ND	ND	
piethyl phthalate	330	ND	ND	
Nitrosodiphenylamine	330	ND	ND	
Hexachlorobenzene	330	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: August 19, 1988 ate Réported:

December 6, 1988

Work Order: 881 Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Mress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081970	88081971
ample No.:	DANGB-BG-MW42-	DANGB-BG-MW42-
	SS1 0-1'	SS3 14.5-15.5'
ate Sampled:	8-18-38	8-18-88
ime Sampled:	13:15	13:25
ate Extracted:	11-2-88	11-2-88
ate Analyzed:	11-21-88	11-21.88
arcent Moisture:	16	9

mpound	Detection Limits		L RESULTS Peight)	
	ug/kg	ug/kg	ug/kg	
nenanthrene	330	ND	ND	
athracene	330	ND	NO	
ibutyl phthalate	330	ND	ND	
luoranthene	330	ND	ND	
-Chlorophenyl phenyl ethe	r 330	ND	ND	
/rene	330	ND	CM	
ctyl Benzyl phthalate	330	ND	ND	
:s(2-ethylhexyl) phthalat	e 330	ND	ND	
arysene	330	ND	CZ	
-Bromophenyl phenyl ether	030	ND	ND	
enzo(a)anthracene	330	ND	ND	
o-n-octylphthalate	330	ND	ND	
enzo(b)fluoranthene	330	ND	ND	
.nzo(k)fluoranthene	330	NE	CN	
enzidine	2000	ND	ND	
,3'-Dichlorobenzidine	660	ND	NI:	
enzo(a)pyrene	330	ND	ND	
ndero(1,2,3-cd)pyrene	230	ND	ND	
lbenzo(a,h)anthracene	330	ND	ND	
-nzo(ghi)perylene	330	ND	NL)	
anzyl Alcohol	560	ND	ND	

⁼ Compound was detected in the blank.

Priority Follutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 19, 1988 mate Reported: December 6, 1988

Work Order: 881 Job Number: OR001

THE SECOND PARTIES OF THE PROPERTY OF THE PROP

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

Lab Number: Sample No.:	88081970 DANGB-BG-MW42- SS1 0-1'	88081971 DANGB-RG-ML42- SS3 14,5-15.5'
Date Sampled: Time Sampled: Date Extracted:	8-18-88 13:15 11-2-88	8-18-88 13:25 11-2-88
Date Analyzed: Percent Moisture:	11-21-88 16	11-21-88 9

^置 Compound	- '		(l Results Veight)
A LAND AND AND AND AND AND AND AND AND AND	ug/kg	ug/kg	ug/kg
Acetophenone	t	ND)	ND
graniline	*	ND	ND
4-Aminobiphenyl	 *	ND	ND
4-Chloroaniline	660	ND	ND
_1-Chloronaphthalene	*	ND	ND
Dibenzofuran	330	ND	ND
<pre>Lp-Dimethylaminoazobenzene</pre>	/	ND	ND
7,12-Dimethylbenz(a)anthra	Rcene*	ND	ND
💈 = -, a-Dimethylphenethylamir		ND	ND
Diphenylamine	*	ND	ND
1,2-Diphenylhydrazine	x	ND	ND
¿Ethyl methanesulfonate	 *	ND ·	ND
[-Methylcholanthrene	×	ND	ND
*Kethyl methanesulfonate	>	ND	ND
C-Methylnaphthalene	330	ND	ΝĐ
ẫ1-Naphthylamine	×	ND	ND
<pre>&≥Naphthylamine</pre>	k	ND	ND
2-Nitroaniline	1600	ND	ND
[3-Nitroaniline	1600	ND	ND
性-Nitroaniline	1600	ND	ND
N-Nitroso-di-n-butylamine	 ★	ND	ND
*N-Nitrosopiperidine	×	ND	ND
Pentachlorobenzene	x	ND	ND
#Pentachloronitrobenzene	*	ND	ND
Phenacetin	k	ND	ND
👬 - Picoline	k	ND	ND
養ronamide	k	ND	ND
1,2,4,5-Tetrachlorobenzene	9 —— ¾	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutäht Ahalysis Pestisides and PCBs / SW 8270 Matrix: Soil

te Received: August 19, 1988

Work Order: 881 Job Number: OR001

R: ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

idress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number: ample No.:	88081970 DANGB-BG-MW42- SS1 0-1'	88081971 DANGB-BG-MW42- SS3 14.5-15.5'
are Sampled:	8-18-88	8-18-88
:me Sampled:	13:15	13:25
ate Extracted:	11-2-88	11-2-88
nte Analyzed:	11-21-88	11-21-88
ercent Moisture:	. 16	9

mpou n â	Detection Limits		LYTICAL RESULTS (dry weight)
		ug/kg '	ug/kg ug/kg
.pha-BHC	x	ND	ND ND
mma-BHC	 ★	ND	ND
-ta-BHC	660	ND	NE
ptachlor	330	ND	ND
elta-BHC	500	ND	ND
.drin	330	ND	ND
ptachlor epoxide	339	CM	ND
.dosulfan i	×	ND	ND
eldrin	500	NΣ	ND
4'-DDE	1000	NL;	ND
Grin	x	N:D	CN
dosulfan II	+	ND	ND
4'-DDD	50e	NĐ	ND
4'-DDT	830	ND	CV/
dosulfan Sulfate	1000	ND	ND
drin aldehyde	x	ND)	ND
drin Ketone	- - ★	ND	ND
lordane	2000	ND	ND
thexychlor	*	ND	ND
xaphene	2000	ND	ND
oclor-1016	2000	ND	ND
roclor-1221	2000	ND	ND
oclos-1232	2000	ND	ND
oclor-1242	2000	ND	ND
oclor-1248	2000	NE)	ND
oclor-1254	2000	ND	ND
roclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Pate Received: August 19, 1988 Tate Reported: December 6, 1988

Work Order: 881 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081970	88081971
Tample No.:	DANGB-EG-MW42-	DANGB-BG-MW42-
•	SS1 0-1'	SS3 14.5-15.5'
<pre>sate Sampled:</pre>	8-18-88	8-18-88
ime Sampled:	13:15	13:25
Date Extracted:	11-2-88	11-2-88
ware Analyzed:	11-21-88	11-21-88
rate Analyzed: ercent Moisture:	16	9

Compound	Detection Limits	ANALYTICA (dry w		
The Control of the Co	ug/kg	ug/kg	ug/kā	
77-Chlorophenol	330	ND ND	ND	
}}-Nitrophenol	330	ND	ND	
Phenol	330	ND	ND	
2,4-Dimethylphenol	330	ND	ND .	
\$,4-Dichlorophenol	330	ND	ND	
12,4,6-Trichlorophenol	330	ND	ND	
4-Chloro-3-methylphenol	660	ND	ND	
12,4-Dinitrophenol	1600	ND	ND	
12,6-Dichlorophenol	·- ·- *	ND	ND	
2-Methyl-4,6-Dinitrophenol	1600	ND	ND	
Pentachlorophenol	1600	ND	ND	
}-Nitrophenol	1600	МD	ND	
¹ benzoic Acid	1600	СN	ND	
_2-Methylphenol	330	ND	ND	
- & 4-Methylphenol	330	ND	ND	
12,3,4,6-Tetrachlorophenol	*	ND	ND	
2,4,5-Trichlorophenol	330	ND	CN	
Control of the Contro				

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

are Received: August 19, 1988 ate Reportedia December 6, 1988

Work Order: 881 Job Number: OR001

DR:

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

dress: 710

710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Ab Number:	88081972	88081973
ample No.:	DANGB-3SS-E2	DANGB-3SS-DO
ate Sampled:	`3-18-88	8-18-88
ime Sampled:	13:00	11:25
ate Extracted:	8-27-88	8-27-88
Tate Analyzed:	11-28-88	11-28-88
ercent Moisture:	10	16

mpound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
.3-Dichlorobenzene	330	ND	ND	
,4-Dichlorobenzene	330	ND	ND	
exachloroethane	330	ND ·	ND	
is(2-chloroethyl)ether	330	ND	ND	
,2-Dichlorobenzene	330	ND	ND	
-Nitrosodimethylamine	330	ND	ND	
is(2-chloroisopropyl)ethe	r 330	ND	ND	
-Nitrosodi-n-propylamine	330	CN	ND	
:xachlorobutadiene	330	ND	ND	
,2,4-Trichlorobenzene	330	ND -	ND	
itrobenzene	330	ND	ND	
rophorone	330	CN	ND	
aphthalene	330	ND	ND	
is(2-chloroethoxy)methane	330	ND	ND	
Chloronaphthalene	330	ND	ND	
exachlorocyclopentadiene	330	ND	ND	
renaphthylene	330	ND	ND	
renaphthene	330	ND	ND	
imethyl phthalate	330.	ND	ND	
,6-Dinitrotoluene	330	ND	ND	
luorene	330	ND	ND	
,4-Dinitrotoluene 🐭 🚈 🦠	330	ND	ND	
iethyl phthalate	330	ND	ND	
-Nitrosodiphenylamine	330	ND	ND	
rxachlorobenzene	330	NĎ	ND	

⁼ Compound was detected in the blank,

Priority Follutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Pate Received: August 19, 1988 Work Order: 881
Date Reported: December 6, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081972	88081973
Lab Number: Sample No.:	DANGB-3SS-E2	DANGB-3SS-DO
Date Sampled:	8-18-88	8-18-88
Pime Sampled:	43:00	11:25
Time Sampled: Date Extracted:	8-27-88	8-27-88
Date Analyzed:	11-28-88	11-29-88
gpercent Moisture:	. 10	16

•	Detection Limits		AL RESULTS veight)	
To constitute the second secon	ug/kg	ug/kg	ug/kg	
Phenanthrene	330	ND	ND	
# Anthracene	330	ND	ND	
Dibutyl phthalate	330	ND	ND	
Fluoranthene	330	ND	ND	
_4-Chlorophenyl phenyl ethe	r 330	ND	ND	
Pyrene	330	ND	ND	
Eutyl Benzyl phthalate	330	ND	ND	
Bis(2-ethylhexyl) phthalat	e 330	ND	ND	
Chrysene	330	ND	ND	
#-Bromophenyl phenyl ether	330	ND	ND	
Benzo(a)anthracene	330	ND	ND	
Di-n-octylphthalate	330	ND	ND	
Benzo(b)fluoranthene	330	ND	ND	
**Benzo(k)fluoranthene	333	NE)	ND	
_Benzidine	2000	ИD	ND	
資,3'-Dichlorobenzidine	660	ND	ND	
Lienzo(a)pyrene	330	ND	ND	
Indeno(1,2,3-cd)pyrene	330	ND	ND	
[Dibenzo(a,h)anthracene	330	ND	ND	
Benzo(ghi)perylene	330	ND	ND	
Benzyl Alcohol	660	ND	ND	

B = Compound was detected in the blank.

THE SECTION OF THE PROPERTY OF

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Reported August 19, 1988 ate Reported Vecember 6, 1988

Work Order: 881 Job Number: OR001

r: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Press: 710 S. Illinois Ave. Suite F-103

Oak Ridge, TN 37830

ab Number:	88081972	88081973
ample No.:	DANGB-35S-E2	DANGB-3SS-DO
ate Sampled:	8-18-88	8-18-88
ime Sampled:	13:00	11:25
ate Extracted:	8-27-88	8-27-88
ate Analyzed:	11-28-88	11-28-88
arcent Moisture:	10	16

empound . I	Detection Limits	-	nl Results Veight)
	ug/kg	ug/kg	ug/kg
retophenone	~~*	ND	ND
niline	×	ND	ND
-Aminobiphenyl	~-*	ND	ND
-Chloroaniline	660	ND	ND
-Chloronaphthalene	~-*	ND	ND
benzofuran	330	ND	ND
-Dimethylaminoazobenzene	x	ND	ND
12-Dimethylbenz(a)anthra		ND	ND
-,a-Dimethylphenethylamin		CN	ND
phenylamine		ND	ND
,2-Diphenylhydrazine	'X'	ND	GN
nyl methanesulfonate	~-×	CZ	ND
-Methylcholanthrene	*	ND	NÐ
ethyl methanesulfonate	~~~ X	ND	ND
-Methylnaphthalene	330	ND	ND
-Naphthylamine	*	ND	ND
-Naphthylamine	¾	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	NL)	ND
-Nitroso-di-n-butylamine	<u>*</u>	ND	ND
Nitrosopiperidine	-~*	СИ	ND
entachlorobenzene	K	CN	ND
entachloronitrobenzene	*	ND	ND
.enacetin	×	, ND	ND
-Ficoline	+	ND	ND
conamide	*	ND	ND
.2.4.5-Tetrachloropenzens	·*	ND	ND

EPA has not yet determined detection limits for these compounds.

⁻ Compound was detected in the blank.

Priority Follutant Analygis Pesticides and PCBs - 3W 8270 Matrix: Soil

Date Received: August 19, 1988 Work Order: 881 Date Reported: December 6, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden

FOR: ES:Oak Ridge/Duluth ANGB Address: 710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830

THE RESIDENCE OF THE PROPERTY

HE THE LONGING OFFICE HARDING WIND STREET STREET FOR THE THE TRANSPORT WAS THE STREET TO SEE THE TO SEE THE TO

Lab Number:	88081972	88081973
Sample No.:	DANGB-3SS-E2	DANGB-3SS-DG
Date Sampled:	8-18-88	8-18-88
Time Sampled:	13:00	11:25
Date Extracted:	. 8-27-88	8-27-88
Pate Analyzed:	11-28-88	11-28-88
Fercent Moisture:	10	16

pour ompound	D_tection Limits		ICAL RESULTS y weight)
\$\frac{1}{2}	ug/kg	nā/kā	ug/kg
Alpha-BHC		ND	ND ND
Gamma-BHC	*	ND	ND
-Beta-BHC	660	ND	ND
Heptachlor	330	ND	ND
Delta-BHC	500	ND	ND
Aldrin	330	ND .	ND
Heptachlor epoxide	330	ND	ND
Endosulfan I	~- x	ND	ND
Dieldrin	500	ND	ND
TÉ, 4'-DDE	1000	ND	ND
Endrin	X	ND	ND
¹ Endosulfan II	*	NЭ	ND
_4,4'-DDD	500	ND	· ND
1 £, 4'-DDT	830	ND	ND
lEndosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
[Endrin Ketone	 *	ND	ND
lthlordane	2000	ND	ND
Methoxychlor	×	N:D	ND
r oxaphene	2000	ND	ND
Aroclor-1016	2000	ND	NÐ
Aroclor-1221	2000	ND	ND
Aroclor-1232	2000	ND	ND
Aroclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND
Aroclor-1254	2000	ND	ND
Paroclor-1260	2000	СN	ND
1 2 2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4			

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

ate Received: August 19, 1988 te Reported: December 6, 1988

Work Order: 881 Job Number: OR001

ATTN: Mr. Bill Hayden

OR: ES: Oak Ridge/Duluth ANGB dress:710 S. Illinois Ave, Suite F-103

18 3 B

Oak Ridge, TN 37830

Constitution of the constitution of	Detection	AMATUTTOAT	DECHTE
-rcent Moisture:	. Mak jillen dann mar 1900 1900 1804 1806 1807 1800 1800 1800 1800 1800 1800 1800	10	16
ate Analyzed:	•	11-28-88	11-28-88
ate Extracted:		8-27-88	8-27-88
ime Sampled:	'	13:00	11:25
ate Sampled:	1	3-18-88	8-18-88
ample No.:	•	DANGB-3SS-E2	DANGB-355-D0
ab Number:	t - 10 10 10 10 10 10 10 10 10 10 10 10 10	88081972	88081973

empound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
-Cnlorophenol	330	ND ND	NI)	
-Nitrophenol	330	ND	ND	
neno1	330	ND	ND	
.4-Dimethylphenol	330	ND	ND	
.4-Dichlorophenol	330	ND	ND	
,4,6-Trichlorophenol	330	ND	ND	
-Chloro-3-methylphenol	660	ND	CN	
,4-Dinitrophenol	1600	NĎ	ND	
,6-Dichlorophenol	~~*	ND	ND	
-Methyl-4,6-Dinitrophenol	1600	ND	ND	
entachlorophenol	1600	ND	ND	
-Nitrophenol	1600	NE:	ND	
enzoic Acid	1600	СИ	ND	
-Metnylphenol	330	ND	ND	
- & 4-Methylphenol	330	ND	ND	
,3,4,6-Tetrachlorophenol	*	ND	ND	
,4,5-Trichlorophenol	330	ND	ND	

Analysy

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

DTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received: August 19, 1988 Date Reported: December 6, 1988

Work Order: 881 Job Number: OR001

のいかないないないというというという これからないとうしょうこんのいろしていること

FOR: ES:Oak Ridge/Duluth ANGD 710 S. Illinois Ave, Suite F-103 Oak Ridge. TN 37830

ATTN: Mr. Bill Hayden

Lab Number:	88081974	88081975
Tample No.:	DANGB-3SS-49	DANGB-3SS-D1
Time Sampled:	8-18-88	8-18-88
	11:00	11:45
Date Extracted: Date Analyzed:	8-27-88	11-2-88
量Date Analyzed:	10-28-88	11-21-88
Percent Moisture:	11	8

Compound	Detection Limits		L RESULTS reight)
	ug/kg	ug/kg	ug/kg
41 2 Dish 2	220		ND
1,3-Dichlorobenzene	330 330	ND ND	ND ND
1,4-Dichlorobenzene		ND ND	
Hexachloroethane	330	ND	ND
3is(2-chloroethyl)ether	330	ND	ND
1,2-Dichlorobenzene	330	ND	ND
N-Nitrosodimethylamine	330	ND	ND
3is(2-chloroisopropyl)ethe		ND	ND
%-Nitrosodi-n-propylamine		ND	ND
Hexachlorobutadiene	330	ND	ND
1,2,4-Trichlorobenzene	330	ND	ND
§ Vitrobenzene	330	ND	ND
*Isophorone	330	ND	ND
Naphthalene	330	ND	ND
3is(2-chloroethoxy)methane	330	ND	ND
2-Chloronaphthalene	330	ND	ND
Hexachlorocyclopentadiene	330	ND	ND
{ Acenaphthylene	330	ND	ND
Acenaphthene	330	ND	ND
Dimethyl phthalate	330	ND	ND
2,6-Dinitrotoluene	330	ND	ND
Fluorene	330	ND	ND
2,4-Dinitrotoluene	330	ND	NĎ
Diethyl phthalate	330	ND	ND
N-Nitrosodiphenylamine	330	ND	ND
Hexachlorobenzene	330	ND	ND

B = Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: August 19, 1988 Work Order: 881 ate Reported: December 6, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Cak Ridge, TN 37830

ab Number: 88081974 88081975
ample No.: DANGB-3SS-49 DANGB-3SS-D1
ate Sampled: 8-18-88 8-18-88
ime Sampled: 11:00 11:45
ate Extracted: 8-27-88 11-2-88
ate Analyzed: 10-28-88 11-21-88
ercent Moisture: 11 8

 ompound
 Detection
 ANALYTICAL RESULTS

 Limits
 (dry weight)

 ug/kg
 ug/kg

 nenanthrene
 330
 ND
 ND

 nthracene
 330
 ND
 ND

 ibutyl phthalate
 330
 ND
 ND

 luoranthene
 330
 ND
 ND

ibutyl phthalate luoranthene -Chlorophenyl phenyl ether 330 ND ND ND 330 ND yrene utyl Benzyl phthalate 330 ND ND is(2-ethylhexyl) phthalate 330 ND ND hrysene 330
-Bromophenyl phenyl ether 330
enzo(a)anthracene 330
i-n-octylphthalate 330
enzo(b)fluoranthene 330
enzo(k)fluoranthene 350
enzidine 2000
.3'-Dichlorobenzidine ND ND ND ND · ND ND ND ND ND ND ND ND ND ND ,3'-Dichlorobenzidine 660 enzo(a)pyrene 330 ND ND ND ND enzo(a)pyrene

ndeno(1,2,3-cd)pyrene

ibenzo(a,h)anthracene

enzo(ghi)perylene

enzyl Alcohol

330

660 ND ND ND ND ND ND ND ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

(continued)

Date Received: August 19, 1988 Work Order: 881 Date Reported: December 6, 1988 Job Number: OR001

For: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

tah Mumban.	88081974	88081975
Lab Number:		
Sample No.:	DANGB-3SS-49	DANGB-3SS-D1
Jate Sampled:	8-18-88	8-18-88
Time Sampled:	11:00	11:45
Date Extracted:	8-27-88	11-2-88
Date Analyzed:	10-28-88	11-21-88
Percent Moisture:	11	8

Compound	-		.cal Results v weight)	
	ug/kg	ug/kg	ug/kg	
Acetophenone	*	ND	ND	
Aniline	*	ND	ND	
4-Aminobiphenyl	×	ND	ND	
4-Chloroaniline	660	ND	ND	
1-Chloronaphthalene	 *	ND ND	ND	
Dibenzofuran	330	ND ND	ND	
p-Dimethylaminoazobenzene	*	ND ND	ND ND	
7,12-Dimethylbenz(a)anthra		ND ND	ND	
a-,a-Dimethylphenethylamir		ND	ND ND	
Diphenylamine	*	ND	ND ND	
1,2-Diphenylhydrazine	*	ND ND	ND	
Ethyl methanesulfonate	*	ND ND	ND	
3-Methylcholanthrene	*	ND	ND	
1ethyl methanesulfonate	*	ND ND	ND	
2-Methylnaphthalene	330	ND	ND	
1-Naphthylamine	*	ND	ND	
2-Naphthylamine	×	ND ND	ND	
2-Nitroaniline	1600	ND	ND	
3-Nitroaniline	1600	ND ND	ND ND	
1-Nitroaniline	1600	ND ND	ND	
N-Nitroso-di-n-butylamine	*	ND	ND	
N-Nitrosopiperidine	*	ND	ND	
Pentachlorobenzene	~~*	ND	ND	
Pentachloronitrobenzene	~~*	ND	ND	
Phenacetin	~-*	ND	ND	
2-Picoline	*	ND	ND	
oronamide	*	ND	ND	
1,2,4,5-Tetrachlorobenzene	• •	ND	ND	

EPA has not yet determined detection limits for these compounds.

^{3 =} Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Work Order: 881 ate Received: August 19, 1988 ate Reported: December 6, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB idress: 710 S. Illinois Ave, Suite F-103 ATTN: Mr. Bill Hayden

Oak Ridge, TN 37830

ab Number:	88081974	88081975
ample No.:	DANGB-3SS-49	DANGB-3SS-D1
ate Sampled:	8-18-88	8-18-88
ime Sampled:	11:00	11:45
ate Extracted:	8-27-88	11-2-88
ate Analyzed:	10-28-88	11-21-88
ercent Moisture:	11	8

ompound	Detection		CAL RESULTS
	Limits ug/kg	ug/kg	vweight) ug/kg
lpha-BHC	*	ND	ND
amma-BHC	*	ND	ND
eta-BHC	660	ND	ND
eptachlor	330	ND	ND
elta-BHC	500	ND	ND
ldrin	330	ND	ND
eptachlor epoxide	330	ND	ND
ndosulfan I	*	ND	ND
leldrin	500	ND	ND
,4'-DDE	1000	ND	ND
ndrin	*	ND	ND
ndosulfan II	*	ND	ND
,4'-DDD	500	ND	ND
,4'-DDT	830	ND	ND
ndosulfan Sulfate	1000	ND	ND
ndrin aldehyde	*	ND	ND
ndrin Ketone	×	ND	ND
nlordane	2000	ND	ND
ethoxychlor	*	ND	ND
oxaphene	2000	ND	ND
roclor-1016	2000	ND	ND
roclor-1221	2000	ND	ND
roclor-1232	2000	ND	ND
roclor-1242	2000	ND	ND
roclor-1248	2000	ND	ND
roclor-1254	2000	ND	ND
roclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: August 19, 1988
Date Reported: December 6, 1988

Work Order: 881 Job Number: OR001

FOR:

ES: Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081974	88081975
Sample No.:	DANGB-3SS-49	DANGB-3SS-D1
Date Sampled:	8-18-88	8-18-88
Time Sampled:	11:00	11:45
Date Extracted:	8-27-88	11-2-88
Date Analyzed:	10-28-88	11-21-88
Percent Moisture:	11	8

Compou	nd D	etection Limits		CAL RESULTS	
e weeklinger		ug/kg	ug/kg	ug/kg	
2-Chlo	rophenol	330	ND	ND	
	ophenol	330	ND	ND	
Phenol	•	330	ND	ND	
1 2,4-Di	methylphenol	330	ND	ND	
2 4-Di	chlorophenol	330	ND	ND	
2,4,6-	Trichlorophenol	330	ND	ND	
4-Chlo	ro-3-methylphenol	660	ND	ND	
2,4-Di	nitrophenol	1600	ND	ND	
§ 2,6-Di	chlorophenol	*	ND	ND	
2-Meth	yl-4,6-Dinitrophenol	1600	ND	ND	
Pentac	hlorophenol	1600	ND	ND	
, 4-Nitr	ophenol	1600	ND	ND	
Benzoi	c Acid	1600	ND	ND	
12-Meth	ylphenol	330	ND	ND	
3- & 4	-Methylphenol	330	ND	ND	
2,3,4,	6-Tetrachlorophenol	*	ND	ND	
₹ 2,4,5-	Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

NOTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

ate Received: August 19, 1988 Work Order: 881 ate Reported: December 6, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081976	88081977
ample No.:	DANGB-3SS-E0	DANGB-3SS-E2
ate Sampled:	8-18-88	8-18-88
ime Sampled:	12:35	13:15
ate Extracted:	11-2-88	8-27~88
ate Analyzed:	12-1-88	11-28-88
ercent Moisture:	8	17

compound	Detection Limits		L RESULTS reight)	
	ug/kg	ug/kg	ug/kg	
,3-Dichlorobenzene	330	ND	ND	
,4-Dichlorobenzene	330	ND	ND	
exachloroethane	330	ND	ND	
is(2-chloroethyl)ether	330	ND	ND	
,2-Dichlorobenzene	330	ND	ND	
-Nitrosodimethylamine	330	ND	ND	
is(2-chloroisopropyl)eth	er 330	ND	ND	
-Nitrosodi-n-propylamine	330	ND	ND	
exachlorobutadiene	330	ND	ND	
,2,4-Trichlorobenzene	330	ND	ND	
itrobenzene	330	ND	ND	
sophorone	330	ND	ND	
aphthalene	330	ND	ND	
is(2-chloroethoxy)methan	e 330	ND	ND	
-Chloronaphthalene	330	ND	ND	
exachlorocyclopentadiene	330	ND	ND	
cenaphthylene	330	ND	ND	
cenaphthene	330	ND	ND	
imethyl phthalate	330	ND	ND	
,6-Dinitrotoluene	330	ND	ND	
luorene	330	ND	ND	
,4-Dinitrotoluene	330	ND	ND	
iethyl phthalate	330	ND	ND	
-Nitrosodiphenylamine	330	ND	ND	
exachlorobenzene	330	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Pate Received: Pate Reported: Work Order: 881 August 19, 1988 December 6, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB Address: 710 S. Illinois Ave, Suite F-103 ATTN: Mr. Bill Hayden

Oak Ridge, TN 37830

Andreasing a

Lab Number:	88081976	88081977
Sample No.:	DANGB-3SS-E0	DANGB-3SS-E1
Date Sampled:	8-18-88	8-18-88
Time Sampled:	12:35	13:15
Date Extracted:	11-2-88	8-27-88
Date Analyzed:	12-1-88	11-28-88
Percent Moisture:	8	17

*Compound D	etection Limits	ANALYTICA (dry w		
, ,	ug/kg	ug/kg	ug/kg	
Phenanthrene	330	ND	ND	
Anthracene	330	ND	ND	
Dibutyl phthalate	330	ND	ND	
fluoranthene	330	ND	ND	
4-Chlorophenyl phenyl ether	330	ND	ND	
?yrene	330	ND	ND	
Butyl Benzyl phthalate	330	ND	ND	
Bis(2-ethylhexyl) phthalate	330	ND	ND	
Chrysene	330	ND	ND	
4-Bromophenyl phenyl ether	330	ND	ND	
Benzo(a)anthracene	330	ND	ND	
∉ Di-n-octylphthalate	330	ND	ND	
3enzo(b)fluoranthene	330	ND	ND	
ੈ Benzo(k)fluoranthene	330	ND	ND	
Benzidine	2000	ND	ND	
3,3'-Dichlorobenzidine	660	ND	ND	
<pre>@ Benzo(a)pyrene</pre>	330	ND	ND	
<pre>Indeno(1,2,3-cd)pyrene</pre>	330	ND	ND	
pibenzo(a,h)anthracene	330	ND	ND	
3enzo(ghi)perylene	330	ND	ND	
Benzyl Alcohol	660	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

ate Received: August 19, 1988 Work Order: 881 ate Reported: December 6, 1988 Job Number: OR001

or: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081976	88081977
ample No.:	DANGB-3SS-E0	DANGB-3SS-E1
ate Sampled:	8-18-88	8-18-88
ime Sampled:	12:35	13:15
ate Extracted:	11-2-88	8-27-88
ate Analyzed:	12-1-88	11-28-88
ercent Moisture:	8	17

ompound	Detection Limits		al Results weight)
	ug/kg	ug/kg	ug/kg
cetophenone	*	ND	ND
niline	*	ND	ND
-Aminobiphenyl	*	ND	ND
-Chloroaniline	660	ND	ND
-Chloronaphthalene	*	ND	ND
ibenzofuran	330	ND	ND
-Dimethylaminoazobenzene	·*	ND	ND
,12-Dimethylbenz(a)anthr	acene*	ND	ND
-,a-Dimethylphenethylami	ne*	ND	ND
iphenylamine	×	ND	ND
,2-Diphenylhydrazine	*	ND	ND
thyl methanesulfonate	*	ND	ND
-Methylcholanthrene	 *	ND	ND
athyl methanesulfonate	*	ND	ND
-Methylnaphthalene	330	ND	ND
-Naphthylamine	*	ND	ND
-Naphthylamine	*	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroso-di-n-butylamine	· ***	ND	ND
-Nitrosopiperidine	*	ND	ND
entachlorobenzene	*	ND	ND
entachloronitrobenzene	×	ND	ND
nenacetin	*	ND	ND
-Picoline	*	ND	ND
ronamide	*	ND	ND
,2,4,5-Tetrachlorobenzer	ie*	ND	ND

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Work Order: 881 Date Received: August 19, 1988 TDate Reported: December 6, 1988 Job Number: OR001

Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830 ATTN: Mr. Bill Hayden

Lab Number:	88081976	88081977
Sample No.:	DANGB-3SS-E0	DANGB-3SS-E1
LDate Sampled:	8-18-88	8-18-88
Time Sampled:	12:35	13:15
g-Date Extracted:	11-2-88	8-27-88
₫ Date Analyzed:	12-1-88	11-28-88
Percent Moisture:	8	17

Compound	Detection Limits		TICAL RESULTS Ty weight)
7	ug/kg	ug/kg	ug/kg
Alpha-BHC	*	ND	ND
Gamma-BHC	 *	ND	ND
r-Beta-BHC Heptachlor	660	ND	ND
Heptachlor	330	ND	ND
Delta-BHC	500	ND	ND
Aldrin	330	ND	ND
Heptachlor epoxide	330	ND	ND
Endosulfan I	 ★	ND	ND
Dieldrin	500	ND	ND
§ 4,4'-DDE	1000	ND	ND
Endrin	*	ND	ND
Endosulfan II	*	ND	ND ·
₹ 4,4'-DDD	500	ND	ND
4,4'-DDT	830	ND	ND
Endosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
Endrin Ketone	 *	ND	ND
Chlordane	2000	ND	ND
Methoxychlor	X	ND	ND
Toxa∵hene	2000	ND	ND
Arocicr-1016	2000	ND	ND
Aroclor-1221	2000	ND	ND
_z .Aroclor-1232	2000	ND	ND
Aroclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND
Aroclor-1254	2000	ND	ND
Aroclor-1260	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

ate Received: August 19, 1988 Work Order: 881 ate Reported: December 6, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081976	88081977
ample No.:	DANGB-3SS-E0	DANGB-3SS-E1
ate Sampled:	8-18-88	8-18-88
ime Sampled:	12:35	13:15
ate Extracted:	11-2-88	8-27-88
ate Analyzed:	12-1-88	11-28-88
ercent Moisture:	8	17

ompound	Detection Limits		AL RESULTS veight)
	ug/kg	ug/kg	ug/kg
-Chlorophenol	330	ND	ND
-Nitrophenol	330	ND	ND
henol	330	ND	ND
,4-Dimethylphenol	330	ND	ND
,4-Dichlorophenol	330	ND	ND
,4,6-Trichlorophenol	330	ND	ND
-Chloro-3-methylphenol	660	ND	ND
,4-Dinitrophenol	1600	ND	ND
,6-Dichlorophenol	×	ND	ND
-Metnyl-4,6-Dinitrophenol	l 1600	ND	ND
entachlorophenol	1600	ND	ND
-Nitrophenol	1600	ND	ND
enzoic Acid	1600	ND	ND
-Methylphenol	330	ND	ND
- & 4-Methylphenol	330	ND	ND
,3,4,6-Tetrachlorophenol	*	ND	ND
,4,5-Trichlorophenol	330	ND	ND

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank.

OTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

SEMIVOLATILE OPGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EAgiNECF-4 Science Contract	t:
Lab Code: SAS No.: 88 SAS No.	.: SDG No.:
Matrix: (soil/water) 50, /	Lab Sample ID: BLANK
Sample wt/vol: 30 (g/mL) ~	Lab File ID: SC143
Level: (low/med) January	Date Received:
ł Moisture: not dec dec	Date Extracted: 8-37-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 10/1/20
GPC Cleanup: (Y/N) // pH:	Dilution Factor:/

Number TICs found: 20 CONCENTRATION UNITS: // (ug/L or ug/Kg) // (yg/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT '	EST. CONC.	Q
:=====================================		4.09	1200	====
1.	1 Unknown	4.28		¦
2	Unknown hydrocarbon	4,47	700	¦
3.	Unknows '	5,20	3000 13 000	¦
4	Unknown hydrocarbon	5,45	73,000	¦
5	Unknewn:	5.57	1.70	¦
7.	LARKIOWA	5,97	4000	¦ ——
8.		69:	230	¦
	والمرابعة المناجرة ال	المنظم في من من م	14 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1 4 1	
0		740	730	¦
1.		7.96	730	<u>; ——</u>
2		8.03	320	i —
3.		\$//	370	<u> </u>
4		9.75	170	<u> </u>
5.	,	11.36	230	i
6	· ·	10.78	970	
7. 57-10-3	Hexadecanois Heid	35.26	1300	
.8	Unknown	30,00	430	l
.9 .		30,64	300	l
0.		1 <u>32.14.</u>	370	l
1.		34.69	<u> </u>	
2.	.			<u> </u>
3				!
4				l
5				!
6.				!
7.		<u> </u>	<u> </u>	ļ ——
8.		!		<u> </u>
9.				
0.		!!		!

IF

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA	SAMPLE	NO.
-----	--------	-----

Lab Name: Engineers Science Contract	:
Lab Code: Case No.: 881 SAS No.	: SDG No.: Zux
Matrix: (soil/water) soil	Lab Sample ID: 8808/939-2371 BU
Sample wt/vol: 30 (g/mL) 9	Lab File ID: <u>50569</u>
Level: (low/med) low	Date Received:
% Moisture: not dec dec	Date Extracted: 11-2-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 1/-2/-88
GPC Cleanup: (Y/N)	Dilution Factor: 1

Number TICs found:

concentration units: (ug/L or ug/Kg) // // // //

		/		
CAS NUMBER	COMPOUND NAME	RT =======	EST. CONC.	 Q =====
1. 27	Benedon	3.26	3700	
2.	Vn Know	3,39	300	
3.	· · ·	2.34	330	
4.		40.3	600	
5		4,22	570	
6		4.39	230	
7 .		4.52	170	·
8.		4.72	170	
9.		4.99	7700	•
10.		C.14	/ 557)	· ·
11.	4	5-28	1/00	
12.		5.79	/3000	
13		5.83	/30	
1 2		6.74	170	
15. 94	Hexadecansic feed	25.50	830	
16.	Unkrum	29.75	1300	
17.	Orin Jama	30.07	1/00	¦
18.		34.65	560	¦
19.		37.93	130	
20.			1	¦
21.			1	'
22.		•		'
23.				i
24.				'
25				¦
25.		¦ ————		<u> </u>
26.		' 		'
27.		¦	!	i
28.		l ————		¦ ——
30.		·	i	i ——
~ ~ · ,		!	!	! ———

SEMIVOLATILE ORGANICS MALISIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Job No.:

Client: Attn:

Address:

Project:

TICs Found: /0

Project No: DANGB-BG-MW43-Sample Matrix: 50/ 553 23-24/ Sample

Conc. Unit: wy /kg.
Work Order No: 887
Lab Sample ID: 88081966

Lab File ID: 5'0144 Data Received: 8-19-88
Data Extracted: 8-27-88

Data Analyzed: 10-6-88

Data Reported: Dilution Factor: / % Moisture: 14

CAS NUMBER	COMBOUND NAME	<u> </u>	EST, CONO.	<u>ु</u>
		4,36	390	,
1	Unlyour hearthed linear hydrian	5.05	270	
<u> </u>	unknows	5.53	660	
٠ <u>. </u>	unknown	6,03	19,000	
* ·	unknoun	7.36	350	
6.	Man kan OWN	7,94	660	
7.	unterior unsat hydrocanbots 20	8.01	350	l
8.	unlinoum alkylacid Cutter Dr	25.24	1600	!
· c	unknown	30,00	800	i
	unknows	30.73	<u> </u>	
10. 10. 10. 10. 10. 10. 10. 10. 10. 10.				
1 :		·		!
~ ~ .		•		1
26.				·
2 .				
23.				·
23%				·!
				!
				. '

SEMIVOLATILE OFFANICS ANALYSIS DATA SHPET

t	TUANEB	-	<i>B</i> 6	_	30-
---	--------	---	------------	---	-----

LFA SAMILE

End Name: E Mineering Science Contract	Drawer B - Ce
Lab Code: -8 Case No.: 881 SAS No	SDG No.:
Matrix: (soil/water) Soil	Lab Sample ID: <u>8808/967</u>
Sample wt/vol: 30 (g/mL) g	Lab File ID: 50/45
	Date Received: 8-19-58
t Moisture: not dec.	Date Extracted: 10/11/58
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 10/6/98
GPC Cleanup: (Y/N) // pH:	Dilution Factor:/

Number TICs found: 18

CONCENTRATION UNITS: / (ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	
	Unknown	4.09	1400	—-
2	Unknown	5.25	1500	
3	Unknown	5.74	7000	١
	Unknown	5.85	4000	١ <u> </u>
5	Inknown	6.13	18000	<u>ا_</u> ا
6 _		1 6.17	3200 .	1_
7·1_		1 7.07	4200	 _
8		23,65	610	 _
9. 1/1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	واعتدروا خبهه بالهوائه أخداه وساكر بالكواك كالمتاكر	Tiple - Section to Add And	Language 10 / 14 . 19 . 19 . 1	ΙΞ
0. 57-10-3	Hexadocanoic Beid	25,27	2600	1_
	lnknown	1 25.87	1200	_
2 ·	Inkingian hudgerarbon	26,90	100	
3 <u> </u>	Unter your	1 2921	1500	I
4 ·	Interrum	30.20	2500	I
5	Inknown	1 31, 72	2100	I
6 <i>\</i>	Inition hydrocarbon	33.54	2400	I
7 · <u>1</u>	laknown '	1 33.94	1700	I
3 i <u></u>	Inknown hydrocorbon	36,35	2100	I_
9	Tisknown	1_36.721	1000	
0		42.33	1100	_
·	, , , , , , , , , , , , , , , , , , ,	41.34	1800	ا _
² · l		_ <u>:</u>		ا
3		·		l
		_11		ا
5 .	,	11		<u> </u>
6	روز کا او العام العام العام العام العام العام العام العام العام العام العام العام العام العام العام العام الع 	_ ' ' .		
7		1		_
8	med 5 to 1 to 1 to 1 to 1 to 1 to 1 to 1 to			
⁷ •	AND AND AND AND AND AND AND AND AND AND			
0.	the first term of the second o	· 1 · · · · · · · · · · · · · · · · · ·	* 1	

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY DENTIFIED COMPOUNDS

DANGB-	B6-
mw42-55	27-81

Lub Neze: Engin	eering Science o	Contract:	1647-227-8,	_
		SAS No.: SD3 H:	·:	
Matrix: (soil/wat	er) <u>Soil</u>	Lab Sample ID:	8808.968	Rex
Sample wt/wol:	30 (9/mi) gm	Lab File ID:	50566	_
Level: (low/med	Si low 1. Eliner	Date Received:	8-19-88	
* Moisture: not d	ec. // Z alla	Date Extracted:	11-2-88	
Extraction: (Sep	· · · · · · · · · · · · · · · · · · ·	Date Analyzed: _	11/21/88	
GPC Cleanup: (Y	. нд Й (и)	Dilution Factor:		

Number TICs found: 17

A CONTRACTOR OF THE PROPERTY O

Total Mary

THE PROPERTY OF THE PARTY OF TH

The second of the second secon

CONCENTRATION UNITS: // (ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	I RT	EST. DONG.	i Q
			/	=====
2. 71-43-2	benzene	3,23	4100	
2	unknows	3,31	220	!
3		3,38	3/0	
4		3.83	2200	!
5		4.39	260	I
6		4.51	190	1
7		1 472	190	1
8		489 5.12	450 430	
9. 127-18-4	tetrachloroethene	5.12	430	1
.0.	unknown	5,38	5300	1
1	• 1	5,77	14800	1
2.		5.92	190	
3.		7/2	56°	i
4.		29.76	1900	i
5		30.66	560	
6		34.66	980	i
7.		36.45	220	
6.				\ <u> </u>
9		—— <u> </u>	¦ 	¦
9.				¦
20.		·	·	!
1.		 	·	¦
2				¦
3		!	. <u> </u>	·!
		!		. ļ
5.				!
6.				!
!7 .				<u> </u>
8				· I
9. 0.				1

FORM I SV-TIC

SEMIVOLATILE ORGANICS WALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Job No.:

Client: ES: Oakridge

Attn:

Address:

Project: Duluth

TICs Found: 17

Project No: DANGB-BG-MW43-552

Sample Matrix: Sor/

14-15

Conc. Unit: ug /kg Work Order No: 881

Lab Sample ID: 8808/969

Lab File ID: £5972 Date Received: 8-19-88 Date Extracted: 8-27-88 Date Analyzed: 10-26-88

Data Reported:
Dilution Factor: /
% Moisture: / 7

ins no	7.327 Wanasana	ZIMI CHUPTHO	RC	EST, CONC.	Q
1.		unknown	4.09	280	
2.		unknown	4,50	760	1
3.		unknown	495	15.000	i
4		unknown	6,02	200	
5.	- 6 4	111 22-tetrachloroethane	6,06	350	96
6		unknown	(ac) (e	720	1
7	<u> </u>	unknown	6.38	<u> </u>	1
6		usionown	6.71	32.0	!
3 ·	· · ·	unknown	6.76	240	1
·		unknown	23.90	520	
· <u> </u>	*	un lime in	35,47	<u>၁ ဗုပ</u>	
		unknown	26,280	200	
- · - ·		unknown	28.57	9.20	
· · · · · · · · · · · · · · · · · · ·		unknown	<u> </u>	1900	!
		unknown	30.21	320	
. <u>5</u>		unknown	32,98	200	
<u>٠</u> ٠		unknown	35,51	24 000	· ——
	 	· · · · · · · · · · · · · · · · · · ·			:
·					·
ÿ					
<u>-</u> · ——	**, **				
	· ,	·			
- · 					
<u> </u>	the section of the se				! ———
Ţ:	21 m = 1ac , , , ,				!
ੂ			3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		!
	***************************************) , News		·
'ٽ ' <u>— —</u>	 ,				;
<u></u>			· · · · · · · · · · · · · · · · · · ·		:

EPA SAMPLE NO.

TENTATIVELY IDENTIFIED CONPOURS NEET Engineering Science Contract	HDS FANGB-BG-MUHD
Lab Code: Case No.: 881 SAS No.	: SDG No.:
satrix: (soil/water) Soil	Leb Sample ID: 88081970 Re-
	Lab File ID: S0567
	Date Received: 8-19-88
Noisture: not dec. 15.6 dec	Date Extracted: 11-2-88
Extrastion: (SepF/Cont/Sons) SonC	Date Analyzed: 11/21/88
SPC Cleanup: -(Y/N) PH:	Dilution Factor:
	NAME AND ADDRESS OF THE PARTY O

Number TICs found: 2

TO Y Y Y Y Y Y Y

HIGHHARMAN STATE

Server sense

ne ka ganan mengenggan penggangga mengganggan pa angkaranganggang assaskas assaskas

CONCENTRATION UNITS: Kg

CAS NUMBER	CONTION NAME	P.T	EST. CONC.) Q
71-43-2	benzene	3.4	20 00 2800	
2	unknown	5.66	2800	
3	·	!		ļ
		!		ļ
·			·	¦
			.	¦
3			1	1
				i
)i				
	•			1
			.	<u> </u>
•			.	.!- <u></u> -
•		!		
5 • l _		!		.!
•			. 	
3.	,			¦
			·	·
3			.	¦
		i		· i
			·	i
	,	i		
		i		
·				.1
5	,	<u></u>	1	.
1		1	1	.!
			Parameter Total	.!
]-		\\		.

FORM I SY-TIC

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

-	2	ANG	3.6.	mwyal
	-	553	14.5-	15.51

tah Namas Alama .	secure Science contr	act:	- 553 14.5-15.51
in some	Case Ho.: 881 SAS	**a .	en va
man core:	Care No.: OV	NO.:	NO.:
Matrix: (soil/wat	cer) <u>Soil</u>	Lab Sample	ID: 88081971 Re
Sample wt/vol:	30 (g/mL) gm		o: <u>50568</u>
level: (low/med	iec. 9 dec		ved: 8-19-88
* Moisture: not o	dec		sted: <u>//-2-88</u>
Fitraction: (De:	oF/Cont/Sono) <u>Sonc</u>	Date Amaly:	red: <u>11/21/88</u>
GPO Cleanup: (N	(/K) <u>√</u> pH:	Dilution Fa	actor:
lumer Tics four	nd: <u>17</u> (u	NCENTRATION UN	its: /Kg
CAS NUMBER	COMPOUND NAME	RT	EST. CONC. Q
71-43-2	benzara	3,27	4200
•	unknown	3.41	620
3. 79-01-6	1 trichlonethers	3.61	150
4.8	1 untrown	1 3,86	450
5.	intuoren	1 4.37 1 1 4.41	550
6. 79-00-5	11.12-trichloroethans	1 4,41	220
1 7	intured aliphotic-mous		330
8. 127-18-4	tetrachlopethene	5,/3	820
9.	unknown	5.29	1,200
i 10.	1 122 2 tetrachle methans		-/4e00-
10.	unknown	5.78	12000
11. 79-34-5	1122-tetrachlorethan		5/0
12.	introvin	12,01	290
: 57	- ancrown	26.71	290
		29.7b	1900
1 26.			336
17		30.07 34.65	950
1 56	-		
1 - 6		<u> </u>	;;
1 20	_ {		
1 21			
1 22			
1 22		!!	
1 23.		!!	
1 25.		!!	
25		!!	!!
26	_	!!	
27			
28.	_		
29			
30.		11	

FORM I SV-TIC

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Job No.:

Client: ES! OAL RIDGE

Attn: Address:

Project: DULLITH

TICs Found:

Sungle Project No: DANGB-355- E2

Sample Matrix: 50/4 Conc. Unit: NS/KS

Work Order No: 881 Lab Sample ID: \$808/972 RA

Lab File ID: E6327
Date Received: 8-19-88
Date Extracted: 8-27-88
Date Analyzed: E7/28/88

Date Reported: Dilution Factor: / % Moisture: /O

CAS NUMBER	CCMPOUND NAME	RT	EST. CONC.	Q
	Unknown	3.32	180	<u> </u>
	Unknown	3.36	220	
	Unknown	3.51	440	
	Unknown	3.74	670	
	Unknown	3.99	3400	
	Unknown	4,40	410	
	Unknown	4,45	810	
	Unknown	4.55	260	
	Unknown	4.83	17000	
	Unknown	4.92	500	
	· Unknown	6.01	300	
	Unknown	6.00	520	
	Unknown	8.83	180	
	Unknown	9.75	180	
57-10-3	Hexadecanoic Acid	. 23.63	2300	
	Unknown corboxylic acid	25.97	330	
	! UNKNOWN	28.35	2900	
w == -	Unknown hydrocarbon	33.95	1300	·
and the same of th	Unknown hydrocarbon	37,29	1600	*****
		-		
				-

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA	SAMPLE	NO.
-----	--------	-----

TENTATIVELY IDENTIFIED COMP	
Lab Name: Eng neering Science Contra	ct:
Lab Code:Case No.: 881 SAS No	
Matrix: (soil/water) <u>501/</u>	Lab Sample ID: 88081973 REAM
Sample wt/vol: 30 (g/mL) qm	Lab File ID: E 6334
Level: (low/med) <u>low</u> 3/.189	Date Received: 8-19-88
Level: (low/med) <u>low</u> 3/.89 Moisture: not dec. 16.8 dec.	Date Extracted: 8-27-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 11/25/88
GPC Cleanup: (Y/N) N pH:	Dilution Factor:

Number TICs found: 17

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	un Kertzer	3,30	240	
2.		3, 39	526	
3.		1 3.4%	240	
4.		414	200	
5		4.39	480	
6.		437 483	18 000	
7. 57-10-3	hexadecunic acid	23.63	2300	
8. 57-11-4	1 octodecanois acid	25,99	400	
9.	I_ unknown	28.2h 28.41	400	
10		128,41	1100	
11	•	3158	360	
12		1 33.16	240	
13		133.94	280	
14.		134.92	12000	
15.		1 35,02	1 190	
16.		36.23	1 400	
L/	I V	1 37:28	320	
19.				
20				
21.		11		
22				
23.				
24.		1		
25				
26.				
27.				
28.				
29.		1		
30.				

FORM I SV-TIC

SEMIVOLATILE OPGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

1-	Danbb-
	- ee 116.
	2/6-/19
	355-49

	Lab Name: ES	Contract:	355-47
	Lab Code: 881 Case No.: 881	SAS No.:	SDG No.:
	Matrix: (soil/water) 50//	Lab Sample	in: 8808/974
٠	Sample wt/vol: 30 (g/mL) q	Lab File :	D: <u>80266</u>
			ived: $8-19-88$
	* Moisture: not dec. dec.	Date Extra	acted: 8-27-88
;	Extraction: (SepF/Cont/Sonc) Son	C Date Anal	yzed: 10/28/88
: -	GPC Cleanup: (Y/N) // pH:	Dilution :	Factor:/
	Number TICs found: 16	CONCENTRATION UN (ug/L or ug/Kg)	VITS: /kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	Unknown		1600	
2.	I I	3,45	1400	
3.	· · · · · · · · · · · · · · · · · · ·	3.86	260	
4.		4,19	180	<u> </u>
5		4,30	590	I <u> </u>
6		5,00	2000	
7	1	5,45	740	<u> </u>
8	. [5,98	/3000	
9	1-02 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		MAN MARKE	<u> </u>
10	.	6.04	480	
11		7.30	560	<u> </u>
12.		7.89	. 180	ļ
LJ		1 9,5.2	440	<u> </u>
14.	. Y	10,32	440	ļ
15.	Unknown hydrocarbon	11.16	3600	
TO.	1 Unknown	30,94	1000	
17.	Unknown	38.13	290	<u> </u>
18				
19.	. <u> </u>			
20.	<u> </u>			
21	. <u></u>			!
22.				
23.		_		!
24				ļ
25				l

29.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

TENTATIVELY IDENTIFIED COMPOUNDS Lab Name: Engineering Science Contract:		755-D1
Lab Code: Case No.: 881 SAS No.:	: soc	No.:
Matrix: (soil/water) <u>Scil</u>	Lab Sample ID:	88081975 Rex
Sample wt/vol: <u>BO (g/mL) qm</u>	Lab File ID:	50569
	Date Received:	8-19-88
Level: (lov/med) low 3/1/89 * Moisture: not dec. 8 dec.	Date Extracted	: <u>11-2-88</u>
Extraction: (Sep?/Cont/Sond) <u>Senc</u>	Date Amalyzed:	11/23/88
GPC Cleanup: $(Y/R) \underline{\Lambda^{\dagger}}$ pH:	Dilution Facto	or:

Number TICs founc: 20

concentration units: //
(ug/L or ug/Rg).

CAS NUMBUR	ביאא כאוויסישאם	RT	EST. CONC.	Q ======
2. 71-43-2	benzene	3.25	5000	
2	untrown	1 3.3.2	290	
3		3.39	950	
4.		1 3,84	1300	
5	unknown alkene -molut Ed	1 4 03	580	1
6.	untrown	4,22	250	1
7.	,	1 4,45	250	1
8.		4,52	250	
s.		1 4,73	33°	1
10.		4.98	8000	i
11. 127-18-4	tetrachione theme	5.14	980	
12.	un Known	5.33	1900	i —
13.		5.80	14000	i
-4	1	5.84	2600	i
15.		6.76	180	i —
16.		6.98	180	<u> </u>
17.		7.11	350	¦
36		8.04	140	¦
16.				¦
19.	V	29.76	1600	<u> </u>
20.	!	34,67	730	!
21.		-	_	<u> </u>
22.		- !	_	!
23.		-!	_	!
24.		_	- !	!
25.		_ [. !	!
26.	l	_	_	ļ
27,	I	_	_1	!
28		.1	_	!
47.			_	· I
30.				1

FORM I SV-TIC

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

JANGB-	355-
Ex	

and the second of the second

Lab Name: Engineering Science continuation Lab Code: Case No.: 881 SAS	No.: SDG No.:
Matrix: (soil/water) Soil	Lab Sample ID: <u>88091976</u> RE
Sample wt/vol: 30 (g/mL) qm	Lab File ID: 50617
	Date Received: 8-19-88
Level: (low/med) low 3/89 Moisture: not dec. 84 dec.	Date Extracted: 11-2-88
Extraction: (SepF/Cont/Sonc) <u>Sonc</u>	Date Analyzed: 12/1/88
GPC Cleanup: (Y/N) N pH:	Dilution Factor:

Number TICs found: 18

(ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	inknown	3.78	940	
2.	1	3.98	360	
3.		4,16	250	
4.		4,35	220	
5.		4.46	160	
6.	,	7.69	180	
7.	,	4.42	5400	
8	,	4.92	1 690	ii
9		5.31	1250	
10.		5.31	13000	1
11.	• .	6.96	220	
12.		7.19	330	1
13.		12.36	330	
14	V	2490	220	1
15. 57-10-3	hexadecanine acid	24,95	,296	
16	1	27.17	180	
17.		29.77	1300	1
18.	V	32,67	15c	
19				11
20				11
21				11
22				11
23				11
24.		i		11
25.				11
26.				1 1
27.		i		
28.		<u> </u>		1
29.]		1
30.		i		i
		i		1

FORM I SV-TIC

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

!	DANGB-355	١
1	- E1	!

Lab Name: Engineering Science Contract	: IE	_1
Lab Code: Case No.: 8 SAS No.	: SDG No.:	
Matrix: (soil/water) 50/1	Lab Sample ID: 8808/977	REAN.A
Sample wt/vol: 30 (g/mL) gm	Lab File ID: E6335	-,
· · · · · · · · · · · · · · · · · · ·	Date Received: 8-19-88	
Level: (low/med) <u>low</u> 7/1/89 * Moisture: not dec. 1735 dec.	Date Extracted: 8-37-88	
Extraction: (SepF/Cont/Sonc) <u>Sonc</u>	Date Analyzed: 11/28/88	
GPC Cleanup: (Y/N) N pH:	Dilution Factor:/	

Number TICs found: 20

concentration units: (ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q Q
1	unknown	3.3-2	400	
2.		3,42	810	
3		3,49	320	I
4.		1_3,79	360	1
5	.1	3.99 441	520	!
6			480	!
7		1 4.65	18 000	!
8		6.21	320	!
9.		9.82	160	!
10		7.26	160	¦
11. <u>57-10-3</u> 12. <u>57-11-4</u>	hexadecanois acid	1 25,99	2300	¦
13	untusun	27.62	200	¦
14	uncurum	28.29	760	¦
14	-	3/58	360	i —
16.	-	33.93	330	i
17		34.51	2,000	i
18		34,95	290	
19.		36.21	190	1
20.		37.28	490	
21				1
22.			1	1
23			l	l
24.			.1	
25			<u> </u>	!
26		1	_	<u> </u>
27				!
28				!
29				!
30.		1		

FORM I SV-TIC

SCASE NARRATIVE

38081966-88081977

ASSESSED OF THE PROPERTY

The results obtained for the laboratory control sample (LCS) analyzed with these samples for the analytes Cadmium, Chromium, Mercury and Barium exceeded the recommended EPA recoveries. All data associated with this batch was closely inspected and no analytical problems were found. The initial and continuing calibration verification standards and blanks and precision and accuracy recoveries were within acceptable limits with the following exceptions: The LCS for Barium, Cadmium and Chromium applies only to Sample Nos. 88081943-88081959, and 88081966-88081968.

Cadmium spike recoveries and precision exceeded acceptable limits. The spike sample was followed by an analytical spike as required by laboratory standard operating procedure. The results of the analytical spike recovery for Cadmium were within acceptable ranges.

2247

million mineral of the contract of the contrac

ACTION OF THE PROPERTY OF THE STATE OF THE S

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

SAMPLE NO(S):: 88081969-88081976, 88082043-88082049 SAMPLE NO(S):: 88082099-88082101, 88082102-88082104 SAMPLE NO(S):: 88082130-88082133, 88082146-88082148

QC REPORT NO.: ICP-S-0028-88
QC REPORT NO.: ICP-S-0031-88

Due to a suspected interelement matrix interference, all cadmium data at levels reportable by ICP analysis (>1 mg/KG dry weight) are potentially false positives. This is being investigated and follow-up will be provided when available.

STATE STEEDINGS	Countries at table g	economist see	Res Feedward Military	4 Saffadhaffadh	funds.	-
(LOWELTY	CONTRO	7.70	QUALITY CONTROL RESULIS SUMMARI	SUMMAR	11	
	E	METALS	rrs			

大学の大学 ラール

A SPECIAL SCHOOL SECTION SECTI

panipanipani 1

Companies and

Self-baseling.

Security Party

A should be supply

DUNE DEFENDE

Brahlassianise's

A HAMMAN SAIRHA

Parameters

ICP-S-0030-88

10-25-88 8-18-88 mg/KG Soil

QC Report No:	Conc. Unit:	Date Received:	Dilution Factor: Moisture:
08001	ES Oak Ridge	710 S. Illinois Avenue	Suite F-103 Oak Ridge, In. 37830
Job No.:	Client:	Address:	

Duluth ANGB Project: QC Report for Laboratory Sample No(s): 88081943-88081959 88081966-38081968

Frat	
H	

Laboratory Supervisor Approval:

Anal Prep Nethod C1 C2 RPD SA 9-16-88 9-11-88 SW6010 <20 56.4 52.2 8 214 9-16-88 9-11-88 SW6010 <0.5 10.9 11.3 4 5.35 9-16-88 9-11-83 SW6010 <1.0 19.2 21.7 12 21.4	Analyte	Laboratory	Analyte Laboratory Sample Nos.	Date	Date	Anal	Blank	C	uplicate	a n		Spike	Recovery	_	
88081943 88081943 9-16-88 9-11-88 SW6010 <20 56.4 52.2 8 88081943 88081943 9-16-88 9-11-88 SW6010 <0.5 10.9 11.3 4 88081943 88081943 9-16-88 9-11-83 SW6010 <1.0 19.2 21.7 12		Duplicates	Spike	Anal	Prep	Method		C1	. c2			SR	SR SSR	88	Notes
88081943 88081943 9-16-88 9-11-88 SW6010 <20 56.4 52.2 8 88081943 88081943 9-16-88 9-11-88 SW6010 <0.5 10.9 11.3 4 88081943 88081943 9-16-88 9-11-88 SW6010 <1.0 19.2 21.7 12															
88081943 88081943 9-16-88 9-11-88 SW6010 <0.5 10.9 11.3 4 88081943 88081943 9-16-88 9-11-88 SW6010 <1.0 19.2 21.7 12	Barium	88081943	88081943	9-16-88	9-11-88	SW6010	<20	56.4	52.2	œ	214		27.7	103	
88081943 88081943 9-16-88 9-11-88 SW6010 <1.0 19.2 21.7 12	Cadmium	88081943	88081943	9-16-88	9-11-6	SW6010	<0.5	10.9	11.3	4	5.35	10.9	14.7	71N	
2249	Chromium		88081943	9-16-88	9-11-83	SW6010	<1.0		21.7	12	21.4	19.2	45.6	109	
249	22														
9	24														
	9							,							

If % moisture is reported, results are presented on a dry-weight basis. See Legend attached.

Relative Percent Difference (RPD) =
$$\frac{C1-C2}{(C1+C2)/2}$$
 X 100 Cl = Concentration One NG = Not Calculated ND = Not Detected

Percent Recovery (PR) =
$$\frac{SSR - SR}{SA} \times 100$$
 SSR = Spiked Sample Result SR = Sample Result SA = Spike Added (Concentration)

OR001	
Job No.:	

710 S. Illinois Avenue ES Oak Ridge Bill Hayden Address: Client: At cn:

Suite F-103

37830 Oak Ridge, Tn.

Duluth ANGB Project:

QC Report for Laboratory Sample No(s): 8803:969-88081977 88082043-88082049

ICP-S-0031-88 10-26-88 3-19-88 mg/KG Soil 3.1 Dilutton Factor: Date Reported: Sample Matrix: Date Received: Conc. Unit: ZMoisture:

QC Report No:

Laboratory Supervisor Approval:

Spike Recovery SR SSR	218 57 5	1/7 0.70
SA	218	
RPD	58*	
Duplicate C2	104	
13	57.6	-
Blank	<20	5 00
Anal Blank Method	SW6010 <20 57.6 104	SW6010 < 0.5 11 5 0 > 0.108WS
Date Prep	9-11-88	9-11-88
Date Anal	9-10-33	9-10-88
Sample Nos. Spike	88081976 9-10-38 9-11-88	88081976 9-10-88 9-11-88
Analyte Laboratory Sample Nos. Duplicates Spike	88081976	Cadmium 2 88081976
Analyte	Barium	Cadmium

Notes

8

<

51N

14.3

11.5

5.44

22*

9.25

11.5

0.5

S:16010

98

107

52.2

28.9

21.8

Ś

27.5

28.9

<1.0

SW6010

9-11-88

9-10-88

88081976

Chronaium 0 83081976

If % moisture is reported, results are presented on a dry-weight basis. See Legend attached.

See Legend attached.

See Case Narrative attached.

Relative Percent Difference (RPD) =
$$\frac{C1-C2}{(C1+C2)/2}$$
 X 100 Cl = Concentration One NA = Not A Not A NO NC = Not Cl = Concentration Two NC = Not Cl = No

SSR = Spiked Sample Result

Percent Recovery (PR) = SSR - SR x 100

NA = Not Applicable NC = Not Galculated ND = Not Detected

Spike Added (Concentration) SR = Sample Result SA = Spike Added ((

UMMARY	
ESULTS 3	v,
QUALITY CONTROL RESULTS SUMMARY	METALS
QUALITY	

AAF-S-0032-88

Sample Matrix:

Conc. Unit:

QC Report No:

See Notes 8.1

Dilution Factor:

#Moisture:

Date Reported: Date Receiven:

10-26-88

8-19-88 mg/KG Soil

on over the season of the same and supplied the season of the same sea

The state of

"TANKET

「大きない」

Entratagement and

MINNESSHER TANK

Participation of

TOTAL STATE

TANGE SEST

OR001	
No.:	
Job	

ES Oak Ridge

Bill Hayden Address: Client: Attn:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn.

Duluth ANGB Project: QC Report for Laboratory Sample No(s): 88081966-88081977

Laboratory Supervisor Approval:

Method Anal Prep Date Date Anal Sample Nos. Spike Laboratory Duplicates Analyte

ä: Spike Recovery SA RPD Duplicate \overline{c} Bl ank

i, i,

ä

103

5.66

0.98E

4.35E

2

<5.0E

<5.0E

<0.5

7060

9-21-88

!::

初に

28.2

5.71

5.114

*07

8.54

5.71

60.5

7421

10-05-88 88081976 88081976 88081976 Selenium Arsenic

2251

9-21-88 10-11-88 88081976 If X moisture is reported, results are presented on a dry-weight basis.

See Case Narrative attached.

See Legend attached.

See Legend attached.

NA = Not Applicable NC = Not Calculated ND = Not Detected C1 = Concentration One = Concentration Two X 100 Relative Percent Difference (RPD) = C1 - C2(C1 + C2)/2

SSR = Spiked Sample Result SR = Sample Result SA = Spike Added (Concent:

= Not Detected

Spike Added (Concentration)

Percent Recovery (PH) = $\frac{SSR - SR}{SA}$ x 100

QUALITY CONTROL RESULTS SUMMARY METALS

:		1	
Job No.:	OR001	OC Report No:	CVM-S-0019-88
,		Sample Matrix:	Soti
Client:	ES Oak Ridge	Conc. Unit:	mg/KG
At tn:	Bill Hayden	Date Received:	8-18-88
Address:	710 S. Illinois Avenue	Date Reported:	10-25-88
	Suite F-103	Dilution Factor:	NA
	Oak Ridge, Tn. 37830	%Moisture:	28.7

Duluch ANGB Project: QC Report for Laboratory Sample No(s): 88081943-88081959 88081966-88081968

Laboratory Supervisor Approval:

		1	
,	Notes		;
	* "		
· .	Æ		107
Spike Recovery	SSR		1.5
Spike	SR		1.4 <0.1
,	SA		1.4
	RPD.	- Company of the comp	NC .
Duplicate	3		40.1
c	15		<0.1 <0.1 <0.1
Blank			<0 . 1
Anal	Method		7471
Date	prep		9-13-88
Date	Anal		9-13-88 9-13-88
Laboratory Sample Nos.	Spike	delle sidjemme salles sidle sidde sidde sidde sidde sedes sedes sidde sedes.	88081944
Laboratory	Duplicates		88081944
Analyte	,		Mercury

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

C1 = Concentration One C2 = Concentration Two x 100 $c_{1} - c_{2}$ Relative Percent Difference (RPD)

Percent Recovery (PR) = SSR - SR x 100

NA = Not Applicable NC = Not Calculated ND = Not Detected

SSR = Spiked Sample Result
SR = Sample Result
SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY 大学と大学 The supplemental of the su

HINESTON PORTS

The second secon

| 「一般のできる | 「日本のできる | 「日本のできる | 「日本のできる | 「日本のできる | 「日本のできる。」「日本のできる。「日本のできる。「日本のできる。」「日本のできる。「日本のできる。

1

the second second

September 1

でくれるの

METALS

Job No.:

ES Oak Ridge Bill Hayden Address: Cl tent:

Attn:

710 S. Illinois Avenue Suite F-103 37830 Oak Ridge, In.

۰,

70, 77

Duluch ANGB

Project:

Laboratory Supervisor Approval:

W. Carley Street

Dilution Factor:

"Moisture:

Date Reported:

Date Received:

Conc. Unit:

Sample Matrix:

QC Report No:

10-26-88

8-19-88 mg/KG Soil

CVII-S-0020-88

QC Report for Laboratory Sample No(s): 88081969-88081977

Method Anal Date Prep Date Anal Sample Nos. Spike Laboratory Duplicates Analyte

IJ Mercury

0.0 7471

69.1 1.09

If % moisture is reported, results are presented on a dry-weight basis, NOTE:

= Concentration One ច ខ x 100 (c1 + c2)/2 $c_1 - c_2$ Relative Percent Difference (RPD)

Percent Recovery (PR) = SSR - SR x 100

SA

= Concentration Two

NA = Not Applicable HC = Not Calculated ND = Not Detected

SSR = Spiked Sample Result

SR = Sample Result SA = Spike Added (Concentration)

9-14-38 9-14-88

88081976

88081976

60.1

60.1

ž

1.03

95

Notes

쫎

Spike Recovery

S

RPD

Duplicate

Blank

QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS

						1				
Job No.:	OR001					QC Report No:	NO.	TPH-S-0051-88	151-88	
Client:	ES Oak Ridge					Conc. Unit:	trix:	Soil mg/KG		
Address:	710 S. Illinois Avenue	renue				Date Prep	necelved: Prepared:	9-14-88		
	Suite F-103					Date Analyzed:	yzed:	9-15-88		
	Oak Ridge, In.	37830				Date Reported:	Reported:	9-26-88		
						#Moisture:		29.3		
Project:	Duluth ANGB					4	č	•		
QC Report for Laboratory 88081966-	Laboratory Sample No(s): 88081966-88081977, 8808	o(s): , 88081938-88081	-88081942			MWB-	y Supervi	Laboratory Supervisor Approval:	al:	
Laboratory Sample No.	^Anal Method	Blank	SR	SA	¥	PR	MSD	8	RPD	Notes
88081967 	418.1	<100	200	1400	1400	98	1600	100	13	
2254		•								
NOTE: If \$ m	If \$ moisture is reported,	results are pr	re presented	on a	dry-weight basis.	basis.				
Relative Perc	Relative Percent Difference (RPD) =	$= \frac{MS - MSD}{(MS + MSD)/2}$	MSD X 100 SD)/2	2	MS = Spike MSD = Spike	Sample Duplicate		NA = Not Ay NC = Not C	Applicable Calculated	
4	. 400 - (44)	•	:	•	:			= Not	Detected	

Percent Recovery (PR) = $SSR - SR \times 100$

SA

SR = Sample Result SA = Spike Added (Concentration)

ENVIRONMENTAL QUALITY PARAMETERS QUALITY CONTROL RESULTS SUMMARY PETROLEUM HYDROCARBONS

Summittee and the second

githl™skiulinding ₹

C. SafeRajo Malland

ั สมเกินเป็นเป็นหน่างสั

2 mm filthfillis 19

P.G.III'NDGAE

Contigues and an

TPH-S-0051-88B

QC Report No:	Sample Matrix: Conc. Unit:	Date Received:	Date Prepared:	Date Analyzed:	Date Reported:	Dilution Factor:
OR001	ES Oak Ridge	Bill Hayden	710 S. Illinois Avenue		Oak Ridge, In. 37830	
Job No.:	Client:	Attn:	Address:			

Duluth ANGB Project: QC Report for Laboratory Sample No(s): 88081966-88081977, 88081938-88081942 88082102-88082104

Laboratory Supervisor Approval:

ZMoisture:

11-15-88

9-14-88 9-15-88

mg/KG Sott

NA

Notes

Laboratory Sample No.	Anal Method	Blank	SR	SA	MS	PR	MSD	PR	RPD
Blank	418.1	<100	<100	1000	730	73	770	7.7	S

2255

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

X 100 (MS + MSD)/2MS - MSD 11 Relative Percent Difference (RPD)

MS = Spike Sample MSD = Spike Duplicate

NA = Not Applicable NC = Not Calculated ND = Not Detected

Percent Recovery (PR) = SSR - SR x 100

SR = Sample Result SA = Spike Added (Concentration)

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8026

VGC-S-0039-88

Sample Matrix:

QC Report No:

Date Received: Date Prepared: Date Analyzed:

Conc. Unit:

OR001	ES Oak Ridge	Bill Hayden	710 S. Illinois Avenue
Job No.:	Client:	Attn:	Address:

37830 Oak Ridge, In.

Suite F-103

QC Report for Laboratory Sample No(s).:

Duluth ANGB

Project:

88081943-88081953 88081966-88081970

•

Laboratory Supervisor Approval:

8-31-88 9-28-88

Dilution Factor:

Moisture:

Date Reported:

8-19-88 ug/KG Soil

Laboratory Sample No.	Compound	S A	SR.		 R4	MSD		RPD	RPD	QC Limits & Recovery
	Halocarbons: 8010 .								 	
88081967	 1,1-dichloroethane	14.1	Q.	13.0	56	12.7	06	ر 	8	58-124
	Trichloroethene		2 9	14.0	66	12.3	282	 tt	 2 ;	75-110
•	Chlorobenzene	14.1	<u></u>	13.0	36	12.4	88	۲	12	(1-12)
225	Aromatics; 8020						maga visa			
88081967 G	Benzene	14.1	QN 	10.9	177	10.6	1 75	~ 	92	75-123
	Toluene -	14.1	QN -	14.0	66 1	14.2	101	-	16	79-115
	Chlorobenzene	14.1	QN —	12.7	06	12.7	96	0	54	82-112

NOTE: If \$ moisture is reported, results are presented on a dry-weight basis.

x 100 MS - MSD (MS + MSD)/2Relative Percent Difference (PR) =

MS = Spike Sample MSD = Spike Sample Duplicate Percent Recovery (PR) = (MS or MSD) - SR x 100

NG =

Not Applicable Not Calculated Not Detected SR = Sample Result
SA = Spike Added (Concentration)

SCHELL SC

METHOD BLANK SUMMARY

在我里的心实

Calmingapp -

President county

19,200 %

The state of

ą Cę

integration of

OR001 Job No: Client: Attn:

ES Oak Ridge
Bill Hayden
710 S. Illinois Avenue
Suite F-103
Oak Ridge, In. 37830 Address:

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/KG 10-07-88

Laboratory Supervisor Approval:

Duluth ANGB Project:

nne 2.5 0.25 8808 nne 2.5 0.25 8808 nne 3.8 0.25 8808 nne 4.0 0.25 8808 nne 0.35 0.25 8808					0.00				
2.5 0.5 0.5 0.05 0.25 0.35 0.25	Date Instru- CAS Analyzed Fraction ment ID Number	Instru- ment ID		CAS		1	Conc	CRDL	Inclusive Sample Nos.
3.8 0.25 4.0 0.25 0.35 0.25	8-29-88 VGC Carbopack 79-09-2			79-09-2 67-66-3		Dichloromethane Chloroform	2.5	0.25	88081954-88081959 88081938-88081940
4.0 0.25	6081/6058 8-30-88 VGC Carbopack 75-09-2		Carbopack 75-09-2	75-09-2		Dichloromethane	3.8	0.25	88081948-88081949
	8-30-88 VGC Carbopack 75-09-2		Carbopack 75-09-2	75-09-2		Dichloromethane Trichloroethene	4.0	0.25	88081943-88081947 88081950-88081953 88081966-88081971
								100 to 10	
			, 						

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

VGC-S-0038-88

8-50-88

Date Received: Date Prepared: Date Analyzed: Date Reported:

Sample Matrix: ac Report No:

Conc. Unit:

ď.

ug/KG Soil

OR001 Job No.: ES Oak Ridge

Client: Attn:

Bill Hayden

710 S. Illinois Avenue

Address:

Suite F-103

37830 Oak Ridge, Tn.

Duluth ANGB Project: QC Report for Laboratory Sample No(s).:

88081971-88081977 88082000-88082002

Laboratory Supervisor Approval:

9-27-88 NA

Dilution Factor:

Moisture:

9-01-88

		ويستريب مريد ومواسط محدث سحبب سيئيب التاريخ		The state of the s	-					
Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	ES RPD	QC Limits #Recovery
	Halocarbons: 8010									
88082000	1.1-dichloroethane	11.3	Q.	10.2	06	9.04	80	12	50	58-124
	Trichloroethene	11.3	QN -	10.6	1 64	6.6	88	<u></u>	16	75-110
	Chlorobenzene	11.3	QN .	10.7	95	9.9	88	ω	21	71-125
22	Aromatics: 8020									
1. 88082000	Benzene	11.3	<u>Q</u>	10.7	95	6.6	88	∞	56	75-123
	Toluene	11.3	2	11.4	101	10.7	- 95	9 1	16	79-115
	Chlorobenzene	11.3	QN 	10.5	93	10.1	89	===	54	82-112

NOTE: If \$ moisture is reported, results are presented on a dry-weight basis.

x 100 MS - MSD Ħ Relative Percent Difference (PR)

(MS + MSD)/2

- SR x 100

Percent Recovery (PR) = (MS or MSD)

Sk = Sample Result
SA = Spike Added (Concentration) MSD = Spike Sample Duplicate MS = Spike Sample

Not Calculated Not Detected 11 S S

Not Applicable

NA

88-A1-DULUO061 1

OC-FRM3S

METHOD BLANK SUMMARY

THEOLOGIC

\$250 WW. Bridge

Friedhild Inc.

OR001 Job No: Client:

ES Oak Ridge Bill Hayden Attn:

710 S. Illinois Avenue Suite F-103 Oak Ridge, In. 37830 Address:

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/KG 10-07-88

Laboratory Supervisor Approval:

Duluth ANGB
Δ
Project:

Conc CRDL Sample Nos.	2.9 0.25 88082000-88082002 0.15 0.5	4.0 0.25 88081971 0.35 0.25	2.5 0.5 88081972-88081977 0.41 0.13	0.30 0.03 0.32 0.12 2.8 0.20
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane	Dichloromethane 1,1-Dichloroethene Chloroform	1,1,1-Trichloroethane Tetrachloroethene Toluene
CAS Number	75-09-2	75-09-2 71-55-6	75-09-2 75-35-4 67-66-3	71-55-6 127-18-4 108-88-3
Instru- ment ID	 Carbopack 75-09-2 67-66-3	Carbopack 75-09-2 71-55-6	Carbopack	71-55-6 127-18-4 108-88-3
Fraction	VGC	AGC	NG C	
Date Analyzed	8-31-88	8-30-88	9-56-88	
File ID	02	. 73	77	2259

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

OR001

QC Report No.:

OCP-S-0031-88

Client:

ES Oak Ridge

QC Sample No.:

88081967

Attn:

Bill Hayden

Level (Low/Med): Low Date Reported:

11-10-88

Address:

710 S. Illinois Avenue

3783C

Suite F-103

Oak Ridge, Tn.

Project:

Duluth ANGB

Laboratory Supervisor Approval:

awando

QC Report for Laboratory Sample No(s).: 88081966-88081977

88081958-88081959

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2830	ND	101	107	46-127
Heptachlor	2830	ND	100	106	35-130
Aldrin	2830	ND	127	135*	34-132
Dieldrin	7070	ND	310	132	31-134
Endrin	7070	ND	288	122	42-139
4,47-DDT	7070	ND	326	138*	23-134

	MSD Conc.	NCD W	MS %	•,	QC Lit	nits
	In Extract (ug/Kg)	MSD % Rec. #	Rec. #	% RPD #	RPD	REC
Lindane	110	117	107	9	50	46-127
Heptachlor	109	116	106	9	31	35-130
Aldrin	149	158*	135*	16	43	34-132
Dieldrin	336	143*	132	8	38	31-134
Endrin	306	130	122	6	45	42-139
4,4~-DDT	347	147*	138*	6	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 6 outside limits

Spike Recovery: 5 out of 12 outside limits

^{*} Values outside of QC limits

PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY SOIL

Job No:

OROO1

QC Report No.:

OCP-S-0031-88B

Client:

ES Oak Ridge

QC Sample No.:

Blank Low

Attn:

Bill Hayden

Level (Low/Med): Date Reported:

11-10-88

Address:

710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project:

Duluth ANGB

Laboratory Supervisor Approval:

QC Report for Laboratory Sample No(s).:

88081966-88081977 88081958-88081959

NWBURON

Compound	Amount Added (ng)	Sample Conc. In Extract (ug/Kg)	MS Conc. In Extract (ug/Kg)	MS % Rec. #	QC Limits Rec.
Lindane	2000	ND	94.0	141*	46-127
Heptachlor	2000	ND	107	161*	35-130
Aldrin	2000	ND	162	243*	34-132
Dieldrin	5000	ND	314	188*	31-134
Endrin	5000	ND	267	160*	42-139
4,47-DDT	5000	ND	266	160*	23-134

	MSD Conc.	MSD %	MS %	7.	QC Lim	nits
	In Extract (ug/Kg)	Rec. #	Rec. #	RPD #	RPD	REC
Lindane	98.0	147*	141*	4	50	46-127
Heptachlor	107	161*	161*	0	31	35-130
Aldrin	125	188*	243*	26	43	34-132
Dieldrin	317	190*	188*	10	38	31-134
Endrin	265	159*	160*	1	45	42-139
4,47-DDT	293	176*	160*	10	50	23-134

[#] Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 6 outside limits

Spike Recovery: 12 out of 12 outside limits

^{*} Values outside of QC limits

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: OCP-S-0031-88
QC REPORT NO.: OCP-S-0031-88B

Analysis of matrix spikes resulted in recoveries of aldrin, dieldrin and DDT that were higher than EPA QC limits. Analysis of spiked blanks resulted in excessively high recoveries of all spiked compounds. The data associated with these analyses were closely examined. No analytical errors were found. The results suggest that the blanks were spiked twice.

Endrin aldehyde and Kepone were not recoverable because they were removed by the alumina column clean-up used on these samples.

FESTICIDE METHOD BLANK SUMMARY

Job No.:

ORO01

Lab Name:

Engineering Science

Lab Sample No.:

Blank

Client: Attn:

ES Oak Ridge

Bill Hayden

Matrix:

Soil

Address:

710 S. Illinois Avenue

Level (low/med):

Low

Suit: F-103 37830 Extraction:

Oak Widge, Tn.

(SepF/Cont/Sonc): Date Reported:

Sonc 11-11-88

Project:

Dulu h ANGB

Date Extracted:

8-2/-88

Date Analyzed (1): 9-26-88

Time Analyzed (1): 05:47

Date Analyzed (2): 10-3-88 Time Analyzed (2): 21:50

Instrument ID (1): 5890 #2 GG Column ID (1): OV-1

Instrument ID (2): 5890 #2

GC Column ID (2): Mixed

This Method Blank applies to the following samples, MS and MSD.

EPA Sample No.	Leb Sample ID (1)	Date Analyzed l	Lab Sample ID (2)	Date Analyzed 2
-	88081966	9-26-88	88081974	10-03-88
-	88081967	9-26-88	88081975	10-03-88
_	83081968	9-26-88	88081976	10-03-88
_	88081969	9-26-88		
-	83081970	9-26-88		
_	83081971	9-26-88		
-	83081972	9-26-88		
-	88081973	9-26-88		
_	88081974	9-26-88		
-	88081975	9-26-88		
-	88081976	9-26-88		
-	88081977	9-26-88		
_	88081958	9-26-88		
-	88081959	9-26-88		
	<u> </u>			<u> </u>

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0047-38 10-21-88 12-08-88 3-19-88 3-27-88 ng/kc Soil Dilution Factor; Sample Matrix: Date Analyzed: Bate Reported: Date Received: Date Prepared: ic Paport No: Conc. Unit: %Moisture: 710 S. Hilinois Avenue 378 NO oak Ridge, Ta. Es Oak Ridge Saite F-103 Bill Hayden bilurh A.IGB 100≧0 Job Mo.: 7 Sroject: Address: Client: Attn:

Laboratory Supervisor Approval:

3C Report for Labort ory Staple 30(s): \$4081966-88081977

ene 4690 · 39 2570 55 769 16* 110* 23 4690 Nb Nb 1800 38 56 922 20* 95* 19 4690 Nb 1800 38 580 12* 104* 47 4690 Nb 4060 87 1310 28* 102* 36 91 amine 4690 10 3090 66 1270 27* 84* 38 4690 10 1740 37 512 11* 108* 27	Fraction	punoduo, s	γs	SIR	MS	<u></u>	MSD		RPD	EPA RPD	QC Limit "Recovery
	8/N Laboratory Sample # 88081967	1,2,4-Trichlorobenzene Acenaphthene 2,4-Dinitrotoluene Pyrene N-Nitro.o-di-n-Propylamine 1,4-Dinilorobenzene	4690 4690 4690 4690 4690 4690	£ £ £ £ £	2570 2630 1800 4060 3090 1740	55 56 38 87 66	769 922 580 1310 1270 512	164 204 124 284 278	110* 95* 102* 84* 108*	23 38 38 27 27	38-107 31-137 28-89 35-142 41-126 28-104

17-109

26-93

89% *1:5 9,4% 115#

1570 2190 1390 1950 1630

9630 5600 5450 5870

9390 9390 0.1910 9 390 9390

Pentachlorophenol

£ £ £ £ £

4-Chlon-3-Het hylphenol

4-Nitrophenol

2-Chlorophenol

Labor dory

ACT D

Sample # 88081967

Phenol

19-10 26-133

Ξ

11-114

The quality control sample for this batch is from a different project. If % moisture is reported, results are presented on a dry-weight basis. HOTE:

MA = Not Applicable MC = Not Calculated MD = Mot Detected MS = Spike Sample x 100 $\frac{MS - MSD}{(MS + HSD)/2}$ See Case Narritive attached, Relative Percent Difference (RPD)

MSD = Spike Duplicate SR = Sample Result

SA = Spike Added (Concentration)

Percent Recovery (PR) = (MS or MSD)-SR x 100

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

the Salatanes of

674568075irs

h Cocimbour

- Kidhekhen 1

\$ A Kindonan A

L. NOW ASSESSED.

Laterthickers

A set printe Down

4.8000000

as Jak William

Sacultus28446

\$ Milledon W

をはます

Job No.:	(001	ijć Report No:	BNA-S-0047-93B
		Sample Marrix:	Soil
Client:	ES Oak Ridge	Conc. Phit:	ug/KG
Attn:	eill Hayden	Dite Received:	na na
Address:	710 S. Ullinois Avenue	Date Prepared:	3-27-88
	inite F-103	Date Analyzed:	11-01-88
	Oak Ridge, Ta. 37830	Date Reported:	12-08-88
		Dilution Factor:	NA
		%Moisture:	VN.

adoth Anda

Project:
3 Report for Laboratory Sample No(s);
33081966-88081977

Laboratory Supervisor Approval:

Fraction	S'Ompound	S.A	SR	MS	PR	MSD		RPD	EPA	QC Limit TRecovery	
	1,2,4-T: ichlorobenzene	3330	ON	1220	37%	2300	69	61*	23	38-107	
8/11	Acenaph: hene	3330	<u> </u>	2180	65	2550	76	<u>د</u>	_	28 1-18	-
Laboratory	2,4-Dintrotolucia	3330	£	3360	101	3400	701		-	28-89	
Sample #	Pyrene	3330	문	2910	87	2870	98	_	36	35-142	
Blank	N-Nitroso-di-n-Propylamine	3330	ŝ	2330	70	2660	80	13	38	41-156	-
	1,4-Dichlorobenzene	3330	<u>8</u>	823	25*	1630	65	¥99	27	28-104	
	Pentachlorophenol	6670	e:	5170	87	6100	16	91	47	17-109	
ACLD	Phenol	6670	<u>2</u>	620	70	5000	7.5	7	~	26-90	
Laboratory	2-Chlor phenol	0/99	£	3800	57	4530	68	- 13	20	25-102	_
Sample #	4-Chlor3-Yethylphenol	0299	E E	6730	101	7330	011	8	33	26-103	
Blank	4-Nitrophenol	6670	£	2360	35	1430	7.1	647	20	11-11;	
40TE: 11 %	11 % moisture is reported, results are prese	ire presented		on a dry-welght	bas is.						

See Case Narritive attached.

X 100

 $=\frac{MS - asis}{(MS + BSD)/2}$ Percent Recovery (PR) = (MS or :ISD)-SR x 100

SA

Relative Percent Difference (RPD)

SR = Sample Result SA = Spike Added (Concentration) MS = Spike Sample MSD = Spike Duplicate

NA = Not Applicable NC = Not Calculated ND = Not Detected

Sa mounts

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMABY
SAMPLE NO(S).: 88081966-88081977
QC REPORT NO.: BNA-S-0047-88
QC REPORT NO.: BNA-S-0047-88
WORK ORDER NO.: 881

Samples 880-1968-88081977 were first analyzed out of extract holding time.

Analysis of matrix spike samples resulted in recoveries and/or RPD's for some compounds that were outside EPA (*) limits. Spiked blanks were subsequently analyzed; results showed certain RPD's and recoveries to be outside of RPA QC limits. The data associated with these analyses was closely examined; no errors or problems were found. Mone of the recoveries were severely out of range. Since no compounds were found, this may not adversely affect the data quality objectives of these rosts.

The initial analysis of samples 88081968 and 88081976 resulted in low recoveries of two or more surrogate spikes. These samples were reextracted out of holding time. Analysis of the second extract showed acceptable surrogate spike recoveries.

The initial analysis of samples 8% 61970 and 35081971 resulted in low recoveries for more than one surrogate spike. A second entraction and analysis of these samples gave the sine results, suggesting a matrix effect.

Initial analysis of sample 88081975 resulted in both surragate spike recoveries and internal standard area counts that did not meet EPA QC criteria. A second extraction and analysis of this sample give surrogate spike recoveries and internal standard arts counts that were within EPA QC limits.

Initial analysis of samples 88081972-88081974 resulted in good surrocate spike recoveries but internal area counts that were below EPA QC limits. Examination of the reconstructed ion chromatogram of sample 88081974 showed a hydrocarbon interference. This intract was diluted ten-fold and re-analyzed. Acceptable area counts for the internal standards were obtained. Data from the first analysis is presented in this report. The extracts of samples 88081972 and 98081973 were remainlyzed. Now internal standard area counts were acain obtained, indicating a matrix effect.

Sample Matrix: Soll Conc. Unit: Date Reported: 12-29-88 Laboratory Supervisor Approval:	Conc CRDL Sumple Moss	7. 580819-9-9-1
Sal Co- Da	n)	
B production of the production	Compound (HSL, TIC or Unknown)	Mone Detected
Missessing B posterior		
di medicina di managaran di man	CAS Muaber	· !
Lino department	Instru-	
.vemue		
e nois A	Fract ion	837A
ORODI ES Oak Widge Bill Hayden 710 S. Illin Suite F-103 Oak Ridge, Th Duluth ANGB		82
®. -	Date Analyzed	10-06-88
Job No: Client: Attn: Address:	9	<u> </u>
Job Mo: Cl Lent: Attn: Address	File 1D	S 22F7

Apprehimation of the contraction of the second of the seco

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

Sample Matrix: QC Report No: Conc. Unit: ES Oak Ridge OROOL Job No.: Client:

BNA-S-0059-88

11 - 02 - 8803-27-88

ug/KG Soil

11-21-88 68 - 60 - 10

Date Analyzed: Date Reported:

Date Received: Date Prepared: Dilution Factor:

ZMoisture:

710 S. Illinois Avenue Suite F-103

Bill Hayden

Address:

Attn:

37830 Oak Ridge, In. Laboratory Supervisor Approval:

To Report for Laboratory Sample No(s):

Duluth ANGB

Project:

88081939Re, 88081968Re, 88081970Re-88081971Re 88081975Re, 88081976Re

Fraction	Compound	SA	SR	MS	PR	ÁSD	PR	RPD	EPA RPD	OC Limit ZRecovery
	1,2,4-Trichlorobenzene	3740	QN -	2030	54	808	22*	¥98	23	38-107
B/N	Acenaphthene	3740	£	3110	83	2470	99	23*	13	31-137
Laboratory	2.4-Dinitrotoluene	3740	£	3000	80	2870	77	4	47	28-89
Sample #	Pyrene	3740	£	3300	88	3150	8 %	'n	36	35-142
88082150Re	N-Nitroso-di-n-Propylamine	3740	2	3480	93	2760	74	23	38	417.126
	1,4-Dichlorobenzene	3740	£	502	13*	96	2*	139*	22	28-104
And the second s	Pentachlorophenol	7490	£	7080	76	7150	95	1	4.7	17-109
ACID	Phenol	7490	£	5920	79	4980	99	17	35	26-90
Laboratory	2-Chlorophenol	7490	£	5320	71	4080	54	- 97	2	25-102
Sample #	4-Chloro-3-Methylphenol	7490	£	7720	103	7230	96	9	8	26-103
88032150Re	4-Nitrophenol	7490	g	1350	18	1310	17	m	S	11-114

If % moisture is reported, results are presented on a dry-weight basis. See Case Marrative attached. NOTE:

(MS + MSD)/2MS - HSD Relative Percent Difference (RPD) =

MSD = Spike Duplicate SR = Sample Result MS = Spike Sample

x 100

Spike Added (Concentration)

NA = Not Applicable NC = Not Calculated ND = Not Detected

Percent Recovery (PR) = (MS or MSD)-SR x 100

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

THE THE PERSON AND THE PROPERTY OF THE PERSON AND T

なるを表合

GARRISON, C

一 ・ かろく・

participation in a

prometrament projection of

printeement

THE PARTY OF THE P

これ 一

PANARON.

上室

ま 徳寺 あったまではできるないないないないないないないないない

QC Report No: BNA-S-U059-888 Sample Matrix: Soil Conc. Unit: ug/KG	OROO1 ES Oak Ridge	Job No.: Client:
	OR001	Job No.:

11-02-88 12-07-88 01-09-89

Dilution Factor:

ZMoisture:

Date Analyzed: Date Reported:

Date Date

Received: Prepared:

> Oak Ridge, In. Sufte F-103

710 S. Illinois Avenue

Address:

At tn:

Bill Hayden

37830

Project:

Duluth ANGB

88081939Re, 88081968Re, 88081970Re-88081971Re 88081975Re, 88081976Re 88081975Re, 880819778e, 88081977

Laboratory Supervisor Approval:

QC Limit ZRecovery	38-107 31-137 28-89 35-142 41-126 28-104	17-109 26-90 25-102 26-103 11-114
EPA RPD	23 47 47 36 38 27	4. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8. 8.
RPD	10 10 12 4 4	4 12 13 8 8 10
W.	85 86 85 99 115	.91. 79 72 94 43
MSD	2840 2850 2840 3290 3020 2540	6070 5270 4800 6270 2890
PR	77 77 86 88 110	87 63 86 48
SIM	2590 2580 2860 2930 3670 2380	5800 4670 4200 5770 3180
SR	666666	22222
SA	3330 3330 3330 3330 3330	6670 6670 6670 6670 6670
Compound	1,2,4-Trichlorobenzene Acenaphthene 2,4-Dinitrotoluene Pyrene N-Nitroso-di-n-Propylamine 1,4-Dichlorobenzene	Pentachlorophenol Phenol 2-Chlorophenol 4-Chloro-3-Methylphenol
Fraction	B/N Laboratory Sample # Blank	ACID Laboratory Sample # Blank

NOTE: If % moisture is reported, results are presented on a dry-weight basis.

MS = Spike Sample MSD = Spike Duplicate X 100 (MS + MSD)/2MS - MSD Relative Percent Difference (RPD)

Percent Recovery (PR) = (HS or MSD)-SR x 100

* Not Applicable NC = Not Calculated ND = Not Detected

SA = Spike Added (Concentration) SR = Sample Result

PESTICIDE/PCB STANDARDS SUMMARY

Job No.:

:*OR001

Instrument ID: 5

5890 #2 0V-1

Client:

ES Oak Ridge

Attn:

Bill Hayden

Address:

710 S. Illinois Avenue

37830

Suite F-103

Oak Ridge, Tn.

Date Reported:

11-14-88

Project:

Aroclor-1254 Aroclor-1260

Duluth ANGB

	Date(s) Analys: Time(s) Analys:	ls) of	From: To: From: To:	9-25-88 9-28-88 19:25 13:17	Time o	f Analysis: f Analysis: mple ID: ard)	9-26-8 10:45	8
Compound	RT	RT W	Indow To	Calibration Factor	RT	Calibration Factor	QNT Y/N	%D
alpha-BHC	1 1.35			315068				
beta-BHC	1.45			151451				
delta-BHC	1.64			206150				
gamma-BHC	1.59			280025	1.60	281032	Y	0.36
Heptachlor	2.57			312200	2.59	318167	Y	1.9
Aldrin	3.19			259717	3.21	263183	Y	1.3
Hept. Epoxide	3.91			262500	3.94	268683	Y	2.4
Endosulfan I	4.89			240050	4.92	244633	Y	1.9
Dieldrin	5.73			227750	5.77	232400	Y	
4,4'-DDE	5.78			243333				
Endrin	6.40		•	220663				
Endosulfan II	6.54			259925	6.58	266692	Y	2.6
4,47-DDD	7.31			171750		-		
Endo. Sulfate	8.47			147217 ·				İ
4,47-DDT	9.65			168892	9.72	159200	Y	5.7
Methoxychlor	14.64			123600	14.74	121035	Y	2.1
Endrin Ketone	10.90			275033			ļ	
a. Chlordane	4.99			282450		52 14 14 14		
g. Chlordane	4.50			267983				
Toxaphene								
Aroclor-1016								1
Aroclor-1221								
Aroclor-1232								
Aroclor-1242								
Aroclor-1248								
	1 I		I	1	1	1	1	1

Under QNT Y/N: enter Y if quantitation was performed, N if not performed. %D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

PESTICIDE/PCB STANDARDS SUMMARY

Job No.: OROO1

Instrument ID: 5890 #2

GC Column ID: OV-1

Client:

ES Oak Ridge

Attn:

Bill Hayden

Address:

710 S. Illinois Avenue

37830

Suite F-103

Oak Ridge, Tn.

Date Reported:

11-14-88

.....

Project:

Duluth ANGB

on is amminuted i

	Date(s) Analysis Time(s) Analysis	To: of From:	9-25-88 9-28-88 19:25 13:17	Time	of Analysis: of Analysis: ample ID: dard)	9-26-8 19:43	
Compound	RT	RT Window	Calibration	RT	Calibration	QNT	%D

Compound	RT	RT Window From To	Calibration Factor	RT	Calibration Factor	QNT Y/N	%D
alpha-BHC	1.35		315068	1.35	314363	Y	0.2
beta-BHC	1.45		151451	1.45	150384	Y	0.7
delta-BHC	1.64		206150	1.64	204783	Y	0.7
gamma-BHC	1.59	-	280025				
Heptachlor	2.57		312200	1			
Aldrin	3.19		259717				
Hept. Epoxide	3.91		262500	1			
Endosulfan I	4.89		240050	1			
Dieldrin	5.73		227750				
4,4′-DDE	5.78		243333	5.79	250150	Y	2.8
Endrin	6.40		220663	6.41	232783	Y	5.5
Endosulfan II	6.54	Ì	259925				
4,4~-DDD	7.31		171750	7.33	179650	Y	4.6
Endo. Sulfate	8.47		147217	8.49	163817	Y	11.3
4,4~-DDT	9.65		168892				
Methoxychlor	14.64		123600	1			
Endrin Ketone	10.90		275033	10.91	285650	Y	3.9
a. Chlordane	4.99		282450	5.00	288033	Y	2.0
g. Chlordane	4.50		267983	4.50	272217	Y	1.6
Toxaphene						1	
Aroclor-1016							
Aroclor-1221							
Aroclor-1232							
Aroclor-1242	1						
Aroclor-1248	1						
Aroclor-1254	1 1						
Aroclor-1260							

Under QNT Y/N: enter Y if quantitation was performed, N if not performed.

%D must be less than or equal to 15.0% for quantitation, and less than or equal to 20.0% for confirmation.

Note: Determining that no compounds were found above the CRQL is a form of quantitation, and therefore at least one column must meet the 15.0% criteria.

For multicomponent analytes, the single largest peak that is characteristic of the component should be used to establish retention time and %D. Identification of such analytes is based primarily on pattern recognition.

418.1 INITIAL & CONTINUING CALIBRATION DATA

Job No.: OROO1 Calibration Date:

9-15-88

Instrument I.D.:

Perkin Elmer 257

Grating Infrared Spectrophotometer

Client: Attn: ES Oak Ridge

Attn: Bill Hayden
Address: 710 S. Illinois Avenue

Unit:

R=

mg/L

Suite F-103

Date Reported:

11-09-88

Oak Ridge, Tn.

37830

0.9953

Project:

Duluth ANGB

Laboratory Supervisor Approval:

Laboratory Sample No(s).:

88082043-88082049, 88081966-88081977 88081938-88081942, 88082001-88082002

Standard	Concentration	Absorbance	/Continuous RF /Calibration /Verification
No. 1	0.59	0.115	
No. 2	1.2	0.236	RF = 6.32
No. 3	1.8 .	0.305	
No. 4	2.4	.,0.407	
Cont. Cal. No. 2 (88081938-88081942) (88081966-88081967)	1.36	0.213	114%
Cont. Cal. No. 2 (88081968-88081975)	1.35	0.238	112%
Cont. Cal. No. 2 (88081976-88081977) (88082001-88082002) (88082043-88082044)	1.35	0.230	112%
Cont. Cal. No. 2 (88082045-88082049)	1.35	0.243	112%

SEMIVOLATILE METHOD BLANK SUMMARY

4B

Job No.:

Client Attn: Client:

Address:

Work Order No.:

Lab Sample No.: 03-60

Lab File ID: Sc143

Matrix: Soil Level (low/med):

Date Analyzed: 10-6-33

Time Analyzed: 02'02

Instrument ID: Date Reported:

Project: Dulth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
JANGB-BG- MW43-553 23-24	88 08 1966	50144	10-6-88
ANGB-86-MW43 551 1-2'	88081967	50145	10-6-98
	89081967 NIS	50248	10-26-88
	88081967 MSD	50249	10-26-88
-MW42 552 7-8	88081963	ES 971	10-26-88
-MW43 SSR 14-15	88081969	E5972	10-26-88
-MW42 551 0-1	88(B1970)	E 5973	10-26-88
- MW 42 SS3 14.5-15.5	88081971	E5974, EZ325	10-26-88,11-23-88
DANGB - 355 - E2	88081972	F5975, E6327	1026.88,11-28-88
-00	88081973	E5976, E6334	10-26-88,11-28-88
-49	88081974	E2128, 50266	11-4-88 10-28-38
- 'Dı	88081975	80267	10-29-88
-EO	88081976	50269, 57,338	10-29-88,11-29-88
-EI	88081977	S0411, E6335	11-7-88,11-28-88
	BLANK MS	[FEOYZ	11-1-88
	BLANK MSD	E6643	11-1-88

GC/MS TUNING AND MASS CALIBRATION

Decatluorotriphenylphosphine (DFTFF)

Case No. AD-76

Contractor ENG SCI(9/7/E8)

Contract No. 99-99-99

Instrument 10 #1

Date / Time-10/05/08 17:19.

tab 10 >T2005::03

Data Release Authorized By:

z : ION ABUNDANCE CRITERIA	XRELATIVE ABUNDANCE
1 3c.0 - 60.0% of mass 198	54.44 OK
8 less than 2.0% of mass 69	0.00 OK (0.00) #:
9 mass 69 relative abundance	69.27
O less than 2.6% of mass 6°	,50 OK (.7253) #1
7 40.0 - 60.0% of mass 198	44.75 OK
7 1 less than 1.0% of mass 198	0.60 BK
8 base peak, 100% relative abundance	1 100.00 DK
9 5.0 - 9.0% of wass 198	7.03 OK
5 10.0 - 30.0% of mass 198	18.14 CK
7 greater than 1.00% of mass 198	1 2.05 Of.
1 present, but less than mass 443	10.55 OK
2 greater than 40.0% of mass 193	73.57 OK
5 1°.0 - 23.0% of mass 442	1 14 26 OK (19.37) #2

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANCARDS

 $\sharp 1$ - Value in parenthesis is λ mass 65.

#2 - Value in parenthesis is % mass 442.

ISAMPLE IDI	LA8_I0		TIME_OF_ANALYSIS[
, SSTDCIO	50135	10-5-88	18:14
SSTDO25	50136		19:13
SSTDOYO	50137		20:12
SSTDOGO	50138		21:10
CSTDOSO 1	50139		22:09
SADISO	50148	Y	23:08
, 8808 1959 ms	50141	1 10-6-88	00:06
188081959 MSD 1	so142	:	1 01:04
188081966-77845	50143		03;62
1 88081966	50144		03:00
88081947	50145	†	03:59

introduced box

And the state of t						
-	80.45 60.45	2.830 132 05 4.360 131.95	.538 135.00 .610 186.09	1.444 245.00	1.094 422.00	.493
Start Miles	A^.65	1.238 134.35	.529 187.00	10.918 245.90 2.548 243.70	1.597 423.00 .556 423.90	4.414
	85.65 81.95	1.525 136.05 175 137.05	1.803 189.00 .969 191.00 .825 192.00	.754 253.70 .484 254.90	.323 441.00 37.624 442.00	10.550 73.571
THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TWO IS NAMED IN COLUMN TW	87.0. 90.25	.654 140.05	.233 193.00 1.803 194.90	.601 256.00 .673 257.00	5.015 443.00 .789 443.90	14.264
And Control of the Co		1217 1701.7	1.807 174.70	.158		
Calcondos.						
でする国際の						

'

2275

Case No:	Instrument ID:
Contractor: ENGINEERING - SCIENCE	Calibration Date: 19/96/88 (0/5/88
Contract No:	

Minimum RF for SPCC is

Maximum & RSD for CCC is &

Laboratory ID: Compound	>50135 RF 10.00	>S0136 RF 25.00	>S0137 RF 40.00	>50138 RF 60.00	>50139 RF 80.00	>S0140 RF 120.00	RF 160.00	RRT	RF	¥ RSD	CCC	SPCC	
,	4 45334			4.00///	4 00705								
N-Nitroso-Dimethylamine					1.20725		-		1.28625	7.073			
2-Fluorophenol					1.22813		-		1.32345	10.287			
bis(2-Chloroethyl)ether					1.69445		-		1.68066	7.234			
Phenol					1.91165		-		2.04223	13.181			
Pheno 1-d5					1.44100		-		1.68075	17.840			
Aniline					2.04222		-		2.18137	10.481			
2-Chlorophenol					1.38788		•		1.45912	9.721			
1,3-Dichloropenzene					1.34777		-		1.54401	19.738			
1,4-Dichlorobenzene	2.04619	1.70352	1.45260	1.31673	1.19086	1.05579	-	1.005	1.46095	24.856	*		
Benzyl Chloride	-	-	-	-	-	-	-	-	-	-			
Benzyl Alcohol	.64800	.57035	. 39687	1.05133	. 67890	.36178	-	1.240	.61787	40.247			
1,2-Dichlorobenzene	2.02430	1.74448	1.47956	1.36620	1.27472	1.14097	-	1.056	1.50504	21.683			
2-Methylphenol	1.32236	1.49910	1.43306	1.27976	1.31532	1.36481	-	1.101	1.36907	6.029			
~6-4-Methylphenol	1.66632	1.41989	1.16768	1.17553	1.19627	1.21631	•	1.157	1.30700	15.265	:		(Conc=20
bis(2-chloro:sopropyl)Ether	3.81234	3.45568	3.16830	3.00319	2.89862	2.79956	-	1.098	3.18962	11.984			
N-Nitroso-Di-n-Propytamine	1.67158	1.51367	1.20205	.79728	.94087	1.14207	-	1.150	1.21125	27.449	1	**	
Hexachloroethane	1.00747	.83043	.58690	.50388	.49692	. 43996	-	1.146	.64426	34.917			
Dibromochloropropane	-	-	-	-	-	-	-	-	-	-			
Nitrobenzene	.83898	.70111	,55559	.56430	.58430	.62049	•	.848	.64413	16.945	;		
Nitrobenzene-d5	-	-	-	•	-	-	-	-	-	-			
2-hitrophenol	.26765	.26350	.23970	.23177	. 23284	.22863	-	.919	. 24402	7.023			
Isophorone					1.07550	1.08499	-		1.09917	6.467			
bis(2-Chloroethoxy)methane	.72163	.68119	.61530					.959	.63004	9.192			
2,4-Dimethylphenol	-	.38160	.28812			.32100		.958	.33966	13.194			
Benzoic Acid	-	.23110	.26658			.34408		.995	.29583	15.524			
2,4-Dichlorophenol	.31008	.34391	.30930					.986		5.307			
1,2,4-Trichlorobenzene	.48648	.41535	.37861	.34042		.31462		,991	.37854	16.863			
Maphthalene		1.11432				.77328		1.005		18.902			
4-Chioroaniline	.41419	.55247	.48831	.47939		.49873		1.026		9.129			
Hexachlorobutadiene	. 28289	.24332				.18427		1.050		16.419			

RF - Response Factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

RSD - Percent Relative Standard Deviation

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No: Instrument ID: Calibration Date: 10/06/98 10/5/88 Contractor: Contract No: THE PERSON NAMED IN Minimum RF for SPCC is Maximum & RSD for CCC is & Laboratory ID: >S0135 >S0136 >S0137 >S0138 >S0139 >S0140 RF RF RF RF RF RF RF 10.00 25.00 40.00 60.00 80.00 120.00 160.00 RRT % RSD CCC SPCC 4-Chloro-3-Methylphenol .19327 .37046 .49473 .33925 .42590 .43292 1.174 .38442 26.782 2-Methylnaphthalene .73727 .67448 .58012 .53760 .53771 .49074 1.168 .59299 15.856 .55003 .53856 .50045 .47145 .43574 .39406 Hexachlorocyclopentadiene .860 .48172 12.507 ** Properti .34528 .35296 .32772 .30946 2,4,6-Trichlorophenol .26465 .36054 .887 .32677 10.888 2,4,5-Trichlorophenol .78824 .79945 .52490 .61881 .57179 .898 .66064 19.090 2-Fluorobiphenyl 2-Chloronaphthalene 1.62781 1.48473 1.35045 1.23417 1.13029 .97137 .902 1.29980 18.376 .70534 .69175 .69020 .66554 .59353 2-Nitroaniline .66927 6.680 Dimethylphthalate 1.84930 1.74372 1.54469 1.40882 1.28149 1.03329 .969 1.47688 20.405 2,6-Dinitrotoluene .48330 .46766 .45800 .42183 .38302 .34843 .980 .42704 12.355 2.30603 2.15064 1.89316 1.64540 1.43686 1.09570 Acenaphthy lene .973 1.75463 25.831 3-Nitroaniline .57727 .63651 .64805 .64981 .58150 1.002 .61863 5.854 2,4-Dinitrophenol .16272 .19870 .19161 .21725 1.020 .20181 14.116 1.44944 1.31395 1.20116 1.06798 .99457 ,79884 cenaphthene 1.006 1.13765 20.519 * Dibenzofuran 2.07078 1.86049 1.75565 1.61630 1.50990 1.31944 1.034 1.68876 15.746 2.4-Dinitrotoluene .38614 .41634 .41254 .40997 .38261 .33897 1.046 .39109 7.470 4-Nitrophenol .10112 .34329 .36508 .35108 1.055 .29014 43.544 * # Fluorene 1.56947 1.29480 1.07426 .95164 .91375 .80067 1.092 1.10076 25.865 1.84831 1.56663 1.28345 1.10984 Diethylphthalate .97447 .69160 1.093 1.24572 33.420 .69999 .58164 .49066 . 28789 4-Chlorophenyl-phenylether .85307 .76676 1,096 .61333 33.453 .31776 ,41837 4-Nitroaniline .40267 .40954 .40025 1.112 .38971 10.479 2,4,6-Tribrowophenol .07263 .30802 .35994 .26798 .31199 1.159 .26411 42.367 1,2-Diphenylhydrazine Alpha-BHC Beta-BHC Sama-BHC Delta-BHC Heptachlor Aldrin .70491 .60217 .51517 .43381 .40945 .31097 .895 .49608 28.633 * N-Nitrosodiphenylamine Response Factor (Subscript is amount in mg/L) RRT Average Relative Retention Time (RT Std/RT Istd)

TRSO - Percent Relative Standard Deviation

Average Response Factor

RF

SALANIA ENTE

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VI Page 2 of 4

Contractor: Granteseing - Science Calibration Date: 10/06/88 10/5/88
Contract No:

Minimum RF for SPCC is

Maximum % RSD for CCC is %

Laboratory ID:	RF	>50136 RF	>50137 RF	>S0138 RF	>50139 RF	>S0140 RF	RF		_		
Compound	10.00	25.00	40.00	60.00	80.00	120.00	160,00	RRT	RF	* RSD	CCC SPCC
4,6-Dinitro-2-Methylphenol	-	. 18554	,17555	.14995	.15527	.10108	-	.892	.15348	21.303	
4-Bromophenyl-phenylether	. 32451	. 28840	. 25069	.23737	.23820	.21552	-	.941	.25912	15.452	
Hexach Torobenzene	.47227	.40581	. 35905	.33819	.35183	.32592	•	.959	.37551	14.569	
Pentachlorophenol	•	•	.15813	.20565	, 23165	. 24925	-	1.015	.21117	18.770	#
Phenanthrene	1.34660	1.11786	.99601	.95087	.93572	. 85897	•	1.004	1.03434	16.934	
Anthracene	1.41674	1.25862	1.08200	.97578	.92640	.78526	-	1.010	1.07413	21.490	
Di-n-Butylphthalate	2.19936	1.89988	1.65466	1.57652	1.54396	1.40455	-	1.097	1.71315	16.862	
4,4'-Dibromobiphenyl	3.05749	2.34552	1.92998	1.67416	1.60313	1.35172	-	1.133	1.99367	31.133	
Fluoranthene	1.49564	1.40111	1.22762	1.16738	1.12602	1.00687	-	1.168	1.23744	14.637	*
Heptachlor Epoxide	•	-	•	-	-	-	-	-	-	-	
Endosulfan I	-	-	-	-	-	-	-	-	-	-	
4,4'-DDE	-	-	-	-	-	-	-	-	•	-	
Dieldrin	-	•	-	-	-	-	-	•	-	-	
- ndrin	-	-	-	-	-	-	-	-	-	-	
4,4'-DDD	-	-	•	-	-	-	-	-	-	-	
Endosulfan II	-	-	-	-	-	-	•	-	-	-	
Endrin Aldehyde	-	-	•	-	-	-	-	-	-	-	
4,4'-DDT	-	•	-	-	•	-	-	-	-	-	
Endosulfan Sulfate	_	-	•	-	-	•	•	-	-	-	
Dibutylchlorendate	-	-	•	_	-	-	-	-	-	-	
Benzidine	-	-	.02490	.01352	.08561	.15529	-	. 873	.06983	93.331	
Pyrene	1.86662	1.68167	1.50458	1.45760	1.38360	1.44554	-	. 877	1.55660	11.724	
Terphenyl-d14	-	-	-	-	-	-	-	-	-	-	
Butylbenzylphthalate	1.29143	1.14997	1.00344	.95073	.92295	.95552	-	.951	1.04567	13.876	
3,3'-Dichlorobenzidine	. 12358	.14134	.17629	.16471	.19060	.21424	•	1.001	.16846	19.527	
Chrysene	1.22075	1.16008	1.02348	1.01426	.99473	1.00810	•	1.003	1.07023	8.924	
Benzo(a)Anthracene	1.28234	1.28303	1.19727	1.17659	1.11738	1.17536	-	.998	1.20533	5.439	
bis(2-Ethylhexyl)Phthalate	1.60479	1.40048	1.17557	1.11671	1.04666	1.04261	-	1.013	1.23114	18.309	
Di-n-octylphthalate	3.35506	3.03716	2.74510	2.88816	2.61951	2.38337	-	. 920	2.83806	11.924	. •
Benzo(a)Pyrene	1.24506	1.27047	1.21663	1.29463	1.21299	1.15648	-	.993	1.23271	3.953	*

RF - Response Factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

XRSD - Percent Relative Standard Deviation

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Contractor: ENGINEERING - SCHEAMS Calibration Date: 10/05/89 (0/5/88)
Contract No:

Minimum RF for SPCC is

Maximum 2 RSD for CCC is 2

Laboratory Compound	ID: >S013 RF 10.0	RF	>S0137 RF 40.00	>50138 RF 60.00	RF	>S0140 RF 120.00	RF 160.00	RRT	RF	# RSD	CCC SPCC
****************					*****						
Benzo(b)Fluoranthene	1.635	30 1.55612	1.48339	1.83502	1.67930	1.90647	-	.955	1.68260	9.630	
Indeno(1,2,3-cd)Pyrene	. 944	40 1.00036	1.01959	1.14572	1.05725	1.10766	-	1.174	1.04583	7.023	
Dibenzo(a,h)Anthracene	.793	78 .91041	.91430	1.00248	.93121	.92361	-	1.181	.91263	7.378	
Benzo(k)Fluoranthene	1.406	61 1.33925	1.30942	1.25195	1.14557	.75144	-		1.20071	19.741	
Benzo(g,h,i)Perylene	.919		.98727				-	1.226	.96581	3.952	

RF - Response Factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

IRSD - Percent Relative Standard Deviation

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VI Page 4 of 4

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name:	Engineer	ng Science		Contract:	ORØØ	1_		
		<u>.</u>						·
Sampl	e No.(Stand	lard): <u>\$\$T</u>	DøGæ		Date A	malyzed:	10/5/8	8
Lab File	. ID (Standar	d): <u>-S</u>	138	atherite (Timba	Time A		21:10	<u>)</u>
Instrumer	1							
•		IS1 (DCB)		IS2(NPT)		IS3 (ANT)		
		AREA #	RT	AREA #	RT	AREA #	RT	
	12 ·HOUR STD	42895	9.33	154096	12.95	82324	18.45	
	UPPER LIMIT	. ———	9.83	308192	13.45	164648	18.95	
	LOWER LIMIT	21448	883	77048	12,45	41162	17.95	
	EPA SAMPLE NO.		22222				=====	
u2 02	88081959 mg 18081959 mg 18081966-1724	44213	9.34	169738 170533 173958	12.92	93.825 94375 89427	18.44	
44 04 4505	88081946 188081967		9.32	174462	12.91	99323	18.42	93649
06 07 03								
0.1.1	4							•
12							·	!
15 16								
17 18								
15 20 21		İ						;
23	$\frac{1}{DCB} = 1.4-$	Dichlorobe	i nzene-d	i	PPER LI	M=T = + 13	ರಿಕ ರ≛	1.
IS2 (NPT = Naph	thalene-d8 aphthene-d		i L	nternal OWER LI nternal	standard MIT = - 50 standard	area. % of area.	
≠ Col	umn used to	flag inte	rnal st				asteris	•

FORM VIII SV-1

page __ of __

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

			•			,	
TLab Nama	: Enginee	ong Scie	ارو	Contract:	ORD	\$1	
Lab Code		Case No.:	••	SAS No.:		Job No.:	., .,
Samo	le Nc.(Stand	iard): S57	DØ60	3	Date 3	malyzed:	10/5/88
Lab File	ID (Standa)	rd): <u>'S</u> c	138	• • • • • • • • • • • • • • • • • • • •		malyzed:	
instrum a	nt ID:	· · · · · · · · · · · · · · · · · · ·					• •
Rajines ergin		IS4 (PHN) AREA #	RT	IS5 (CRY) AREA #	- RT	IS4 (PRY) AREA #	RT
et accompliance and a second an	12 HOUR	149748	<i>\$</i> 3,(0	116116	31.57	82938	37.12
A property and the second seco	UPPER LIMIT	299496	23.60	232232	32.07	165876	37,62
The state of the s	LOWER LIMIT	74874	92.W	58058	31.07	41469	36.62
• Cond-constraints	EPA SAIPLE NO.		=====		######		=====
· 42 02 \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	8081959 ms 88081959msD 188181966-778ck		23.09 23.09 23.07	130428 131967 137914	31,52 31,52 31,54	70925 \$8811 42346	37.08 37.07 37.08
	88081966 88081967	155827	03.06	123462 105261	31,52	85645 40367*	<u>37.09</u> <u>37.09</u>
# 07 -4 06 99							
. 10 4							:
14 14 15	·			i			
16 17	·						
	•						
. 22 IS4 (IS5 (781 = 7627 781 = 7827	anthrene-d sene-dll lane-dll	1		OWER LI	nal standa:	ri area. K

Column used to flag internal standard area values with an asterisk

. FORM VIII SV-2

SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

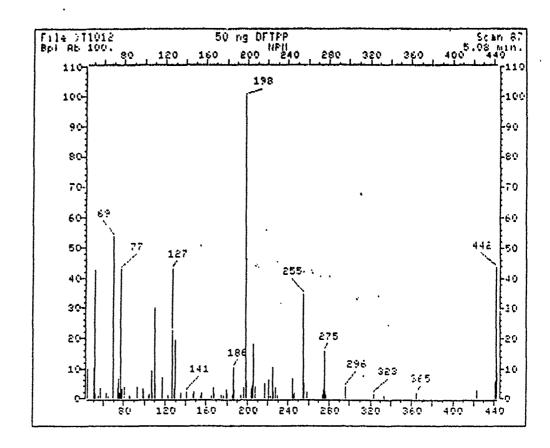
Lab Name: Engineering Science Contract:	
Lab Code:	lo.:
Lab File ID: >T1012 DFTPP Injection Date	e: 10/12/88
Instrument ID: 70 1 DFTPP Injection Time	e: 8:31
	% RELATIVE
m/e ION ABUNDANCE CRITERIA	ABUNDANCE :
51 30.0 - 60.0% of mass 198	
: 68 Less than 2.0% of mass 69	0.0(0.0)11
1 69 Mass 69 relative abundance	54.
70 Less than 2.0% of mass 69	0.0(0.0)1
: 127 : 40.0 - 50.0% of mass 198	43.1
197 Less than 1.0% of mass 198	0.0
: 198 Base Peak, 100% relative abundance	
199 5.0 - 9.0% of mass 198	5.7
275 10.0 - 30.0% of mass 198	
365 Greater than 1.00% of mass 198	1.63
441 Present, but less than mass 443	5.6
1 442 Greater than 40.0% of mass 198	
443 17.0 - 23.0% of mass 442	8.5(19.5)2
1-Value is % mass 69 2-Value is % ma	355 442

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

•					•
L	AB	I LAB	I DATE	TIME	;
. I SAMP	SAMPLE ID		: ANALYZED	: ANALYZED	1
=====================================	SSTDOIU	50147	10/12/88	08:50	1
0177	5517005	50148	10/10/00	09:50	
0272					لهن
	SSTDOYD	1 50149	·	10:50	, v.
	SST DOGO	1 <u>50150</u>	·	11:59	1
051	SSTDO80	1 <u>50 15 1</u>	·	1 19:21	١,
06:	SSTD 120	1 SO 152	·	1 13.51	10
07: 120 STD 46 d. Al	to-2-nethy phanel	.1 <u>50153</u>	1	14:50	1 1
081	1	.	1	i	l
091	!	.	ļ	·	;
101	l	!	l	<u> </u>	!
111		1	l	!	1
121	1	1	1	1	1
13!	!		!	!	;
14!	1		1	1	1
151	1		!	!	:
161	'	· ' ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	!	·	1
171	' 	·	!	·	1
181	!	· ′ 	!	!	
191	* 	!	!	' 	
201	' !	. ' 	!	!	1
3.1	† <u></u>	. ' 	'	'	!
221	!	· ! 	1	'	1
1 of 1	·	. 1	1	'	1

FORM V SV

2282



File: >11012 Scan #: 87 Retn. time: 5.08

電子といる ま

ツージンスニ

Commercial Co.

placement and a

n/2	Int.	n/I	Int.		Int.		Int.	n/2	Int.
44.10	10.042			141.05			100.000		
50.10	10.147	86.00	.760	147.05	1.416	199.00	5.742	256.00	5, 296
51.10	42.528	93.10	3.880	148.05	2.019	204.10	3.251	258.00	2.202
52.20	1.783	98.00	3.015	155.05	.813	205.10	1.248	273.00	1.075
55.00	. 813	99.00	2.596	156.05	1.704	206.10	18.013	274.05	2.910
57.10	3.304	104.00	1,127	164.95	. 891	207.10	-3.933	275.05	15.732
63.10	1.757	105.00	1.390	167.05	3.566	208.00	1.101	276.15	2.124
65.00	.760	107.00	9.150	168.05	1.599	217.00	4.851	277.05	1.259
69.00	53.671	108.00	1.652	175.05	1.101	221.10	6.214	296.05	3,854
74.10	3.435	110.00	30.257	176.95	.760	223.00	.839	323.05	1.573
75.00	6.397	111,00	4,798	178.95	2.937	224.10	10,252	333.95	.918
76.20	1.914	117.00	6.765	180.05	1.862	225.10	2.202	365.00	1.626
77.10	42.993	123.05	1,154	185.05	1.259	227.00	3.356	423.10	2,648
78.10	2.989	127.05	43.052	186.05	10.304	229.00	.970	441.05	5.585
79.02	3.015	128.15	2.989	187.05	2,753	244.10	6.476	442.05	43.603
80.10	1.993	129.05	19.481	193.05	1.023	245.10	1.049	443.05	8.495
81.00	3.880	135.05	1.757	196.10	3.382	246.00	1.730		

Case No:	Instrument ID:
Contractor: ENGINEERING - SCIENCE	Calibration Date: 1943/86 10/12/88
Contract No:	

Minimum RF for SPCC is

Maximum % RSD for CCC is %

Laboratory I Compound	D: >50147 RF 10.00	>S0148 RF 25.00	>S0149 RF 40.00	>S0150 RF 60.00	>50151 RF 80.00	>S0152 RF 120.00	RF 160.00	RRT	RF	₹ RSD	CCC S	PCC
N-Nitroso-Dimethylamine	.90066						•		.90169	3.960		
2-Fluorophenol						1.01973	-	. 692	1.15802	7.457		
bis(2-Chloroethyl)ether			1.14219				•	. 944	1.11892	5.618	:	•
Pheno I						1.21525	•	930	1.41657	9.140	#	
Pneno 1-d5	1.25759	1.28644	1.28389	1.24398	1.19461	1.08277	•	.926	1.22488	6.305		
Aniline	. 64382						-	.923	.54193	30.020		
2-Chìorophenol	1.22637	1.22826	1.30937	1.27696	1.20930	1.14022	•	.953	1.23175	4.733		
1,3-Dichlorobenzene	1.70227	1.56016	1.56285	1.46373	1.33366	1.22942	-	.989	1.47535	11.623		
1,4-Dichlorobenzene	1.60415	1.58473	1.52935	1.33007	1.23116	1.15234	-	1.005	1.40530	13.765	¥	
Benzyl Chloride	-	-	-	-	-	-	•	-	-	-		
Benzyl Alcohol	,70256	. 78793	. 83127	.73111	. 68568	. 63582	•	1.055	.72906	9.736		
1,2-Dichlorobenzene	1.58111	1.50879	1.44256	1.23450	1.12527	1.04213	-	1.056	1.32240	16.611		
2-Methylphenol	1.19931	1.23930	1.25261	1.18987	1.13222	1.02872	-	1.096	1.17367	7,045		
3-&-4-Methylphenol	1.26093	1.27555	1.24755	.98463	.84730	.81239	-	1.143	1.07139	20.169		
is(2-chloroisopropyl)Ether	2.18255	2.24900	2.28383	2.21007	2.10444	1.90770	-	1.099	2.15627	6.323		
N-Nitroso-Di-n-Propylamine	.89387	. 86434	. 84649	.81219	.84343	.78270	•	1.148	.84050	4.639		##
Hexachloroethane	.73320	.66729	.60217	.46735	. 39602	.36437	-	1.146	.53840	28.074		
Dibromochloropropane	-	-	-	-	•	-	-	-	-	-		
Nitrobenzene	.42817	.42509	.41201	.40247	.39152	.35942	-	.848	.40312	6.308		
Nitrobenzene-d5	.39046	.41231	.39349	.39780	.40102	.35317	-	.843	.39137	5.157		
2-Nitrophenol	. 23964	. 24540	. 24634	.25708	.25938	.23156	-	.918	. 24657	4.251	ŧ	
Isophorone	.75667	.74378	.72642	.77683	.77199	. 67452	-	.905	.74170	5.090		
bis(2-Chloroethoxy)methane	.50665	.50869	.50359	.50287	.49561	.44573	-	.959	.49386	4.859		
2,4-Dimethylphenol	.33514	.36242	.35177	.35927	.36227	.32007	-	,939	.34849	4.965		
Benzoic Acid	.17299	. 27723	.33386	.34937	.33894	.31109	-	.991	.29725	22.228		
2,4-Dichlorophenol	.61379	. 62766	.59116	.56480	.53399	.47258	-	.977	.56733	10.114	•	
1,2,4-Trichlorobenzene	.41394	. 39073	.37522	.35401	.35830	.31261	-	.992	.36913	9.266		
Naphthalene		1.07142					-	1.005	.94589	13.894		
4-Chloroaniline	. 29172							1.031	.36309	11.060		
Hexachlorobutadiene	.22743	. 21636	.20185				-	1.051	.20283	8.609		

RF - Response Factor (Subscript is amount in mg/L)

Form VI Page 1 of 4

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

[%]RSD - Percent Relative Standard Deviation

⁻ Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:		Instru	ment ID	•	1							
	ENGINEERING - SCIENCE											
Contract No:												
Minimum RF for SPCC is	5	Maxim	um 2 RSD	for CCC	is ‡							
Laboratory II Compound	D: >S0147 RF 10.00	>50148 RF 25.00	>S0149 RF 40.00	>S0150 RF 60.00	>S0151 RF 80.00	>S0152 RF 120.00	RF 160.00	RRT	RF	z RSD	CCC	SPC
4-Chlore-3-Methylphenol	.29832	.33082	,32801	.32304	.31346	. 28794		1.151	.31360	5.496	•••	
2-Methy Inaphthalene	.61549	.61109	.57140		.53826	48185	_	1.169	256397	8.808	_	
Hexachlorocyclopentadiene	.30966	.27656			.30816	. 24396	_	.860	.29568	10.410		* *
2,4,6-Trichlorophenol	.42456		.44198		.42012			.876	.42280	6.381		
2,4,5-Trichlorophenol	.51933		.56445				-	.883	.52897	7.557		
2-Fluorobiphenyl				1.30034			_		1.27220	9.077		
2-Chloronaphthalene				1.28644			•		1.23784	8.329		
2-Nitroaniline	.40894		.50154			.45555	-	. 929	.47288	8.058		
Dimethylphthalate				1.46712			-		1.40629	7.737		
2,6-Dinitrotoluene	.34868						-	.979	.37415	5.038		
Acenaphthylene			-	1.68395					1.68918	12.959		
3-Nitroaniline	.27339		.47906					1.001	.44557	20.333		
2,4-Dinitropheno!	.03908		.13437		.15560			1.018	.11898	37.056		**
Acenaphthene				1.13575					1.13011	10.936		
ibenzofuran				1.67418					1.64131	6.865		
2,4-Dinitrotoluene	. 24045							1.045		8.547		
4-Nitrophenol	.09719		. 31551					1.042		36.416		**
Fluorene			1.21498	1.07212	1.00539	.90506	_		1.12850			
Diethylphthalate				1.19028					1.20939	16.027		
4-Chlorophenyl-phenylether	. 63776						-	1.097	.59183	10.672		
4-Nitroaniline	.10784							1.110				
2,4,6-Tribromophenol	.18019							1.138		8.921		
1,2-Diphenylhydrazine	•	_	-	•	-	-	-	-	-	-		
Alpha-BHC	-	-	-	-	-	~	~	-	-	-		
Beta-BHC	•	-	-	-	-	-	-	-	-	-		
Gamma-BHC	-	-	-	-	-	-	-	-	-	-		

.45984 .38858 .41237 .40912 .38827 .35898

RF - Response Factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

Delta-BHC Heptachlor Aldrin

N-Nitrosodiphenylamine

#RSD - Fercent Relative Standard Deviation

→CC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VI Page 2 of 4

.894 .40286

8.394 *

Case No:		Instrument ID:	٤	
. contractor:	ENPINEERING SCIENCE	Calibration Date:	10/13/88	10/12/88
Contract No:				

Minimum RF for SPCC is

Maximum & RSD for CCC is &

Laboratory	ID:	RF	>50148 RF	>50149 RF	>S0150 RF	>50151 RF	>\$0152 RF	- RF					
Compound		10.00	25.00	40.00	60.00	80.00	120.00	160.00	RRT	RF	* RSD	יייי	SPCC
4,6-Dinitro-2-Methylphenol		-	-	-		-	.10514	-	.889	.10514	•		
4-Bromophenyl-phenylether		. 22556	.21762	.22271	.21078	.21018	.19123	•	.941	.21301	5.788		
Hexach lor obenzene		, 27697	.27084	.27492	.25719	. 25850	. 23795	-	.959	. 26273	5.594		
Pentachloropheno!		. 09569	.13314	.15747	.16224	.16688	.15675	-	. 987	.14536	18.565		
Phenanthrene		1.14931	1.11829	1.09106	1.01023	.96033	. 87667	•	1.004	1.03431	10.085		
Anthracene		1.15317	1.14102	1.11541	1.02181	.98435	. 89352	-	1.010	1.05155	9.771		
Di-n-Butylphthalate		1.64122	1.63329	1.63090	1.49769	1.41327	1.30096	-	1.097	1.51956	9,293		
4,4'-Dibromobiphenyl		-	-	-	-	-	-	-	-	-	-		
Fluorenthene		1.36288	1.35068	1.26507	1.13505	1.05865	.96048	-	1.168	1.19047	13.935	ŧ	
Heptachlor Epoxide		-	-	-	-	-	-	-	-	-	-		
Encosulfan I		-	-	-	-	-	-	-	-	-	-		
4,4'-DDE		-	-	•	-	-	•	-	-	-	-		
Dieldrin		-	-	-	-	-	-	-	-	-	-		
Endrin		-	-	•	•	-	-	-	-	-	-		
,4′-DDD		-	-	-	-	-	-	-	-	-	-		
Endosulfan II		-	-	-	-	-	-	-	-	-	-		
Endrin Aldehyde		-	-	-	-	-	-	-	-	-	-		
4,4'-DDT		-	-	-	-	-	-	-	-	-	-		
Endosulfan Sulfate		-	-	-	-	-	-	-	-	-	-		
Diputylchlorendate		•	-	-	-	-	-	-	- .	-	•		
Benzidine		-	.00935	.02705	.01524	.11005	.03945	-	.876	.04023	101.177		
Pyrene		1.54293	1.60613	1.64968	1.52682	1.51496	1.52464	-	.876	1.56086	3.490		
Terphenyl-d14		1.02399	1.08928	1.11806	1.04957	1.03383	1.03537	· -	. 896	1.05835	3.512		
Butyloenzylphthalate		1.03976	1.09397	1.08899	1.01671	.99984	.96414	-	.952	1.03390	4.932		
3,3'-Dichlorobenzidine		.06133	.09189	, 14882	.16520	. 19319	.16091	-	.999	.13689	36.415		
Chrysene		1.02911	1.02334	1.04273	.98463	1.00670	.89280	-	1.003	.99655	5.481		
Benzo(a)Anthracene		1.11257	1.15249	1.15796	1.10992	1.09138	1.00011	-	, 998	1.10407	5.175		
bis(2-Ethylhexyl)Phthalate	•					1.14544			1.015	1.2!073	8.300		
Di-n-octylphthalate						3.18000				3.40275	11.200		
Benzo(a)fyrene						1.34816				1.32098	3.101		

RF - Response Factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

^{\$}RSD - Percent Relative Standard Deviation

LCC - Calibration Check Compounds (*) SPCC - System Performance Lneck Compounds (**)

Case No: Instrument ID: 1

Lontractor: ENGINEERING - Science Calibration Date: 10/13/88 10/12/88

Contract No:

Minimum RF for SPCC is

Maximum X RSD for CCC is X

Laboratory 1 Compound	ID: >50147 RF 10.00	>S0148 RF 25.00	>50149 RF 40.00	>S0150 RF 60.00	>S0151 RF 80.00	>S0152 RF 120.00	- RF 160.00	RRT	RF	* RSD	CCC SPCC
Benzo(b)Fluoranthene	1.45767	1.64832	1.56440	1.66938	1.65806	1.65321	-	.950	1.60850	5,160	
Indeno(1,2,3-cd)Pyrene	.88674	.92332	1.00146	1.01832	1.00215	.97603	-	1.195	.96800	5.364	
Dibenzo(a,h)Anthracene	.76140	.84087	.90269	.93942	.91372	.89077	-	1.203	.87481	7.361	
Benzo(k)Fluoranthene	1.49764	1.62755	1.52462	1.33979	1.40346	1.26912	-	. 953	1.44370	9.092	
Benzo(g,h,i)Perylene	.81932	.88183	.94465	.93095	. 90234	.90654	•	1.253	. 89761	4.934	

RF - Response Factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

RF - Average Response Factor

\$RSD - Percent Relative Standard Deviation

- Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Form VI Page 4 of 4

N

GC/MS TUNING AND MASS CALIBRATION

Decafluorolriphenylphosphine (OFTPP)

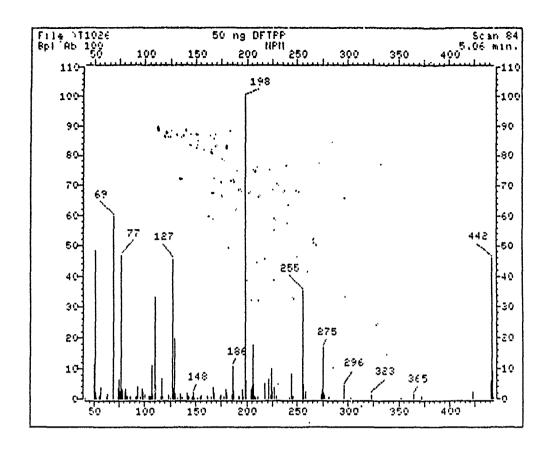
Case No. 123456 Contractor Engineering Scien Contract Ho. 99999999 Instrument ID #1 Date / Time 19/26/88 12:23 Lab 10)11026::02 Data Release Authorized By: XRELATIVE ABUNDANCE I m/z | ION ABUNDANCE CRITEPIA ١. 48.46 OK 1 S1 1 30.0 - 60.0% of mass 198 : 68 : less than 2.0% of mass 69 0.00 DK (0.00) #1 : 69 | mass 69 relative abundance 59.45 : 70 | less than 2.0% of mass 69 0.00 OK (0.00) #1 1 127 1 10.0 - 60.0% of mass 198 45.39 OK : 197 : less than 1.0% of mass 198 .94 OK 198 | base peak, 100% relative abundance 100.00 OK 1 199 | 5.0 - 9.0% of mass 198 6.22 OK 1 275 | 10.0 - 30.0% of mass 198 16.83 OK 1.63 OK 1 365 | greater than 1.00% of mass 198 1 441 | present, but less than mass 443 6.24 OK 1 442 I greater than 40.0% of mass 198 45.88 0% 1 443 : 17.0 - 23.0% of mass 442 9.07 OK (19.77) #2 THIS PERFORMANCE TUNE APPLIES TO THE #1 - Value in parenthesis is X mass 69, FOLLOWING SAMPLES, PLANKS AND STANDARDS. 12 - Value in parenthesis is X mass 442. LA8_10_ _DRTE_OF_AHALYSIS_!__TIME_OF_AHALYSI3__; __SRMPLE ID 150 ng GFTFF _>11026 10/26/89 12:23_ 12:42 55TD460 13:48 14:48 15:48 8082257

1367371-572255 178081947 m5 | 128681967 m5 | 128092757 BNAH 188092858 ACRA

8002757574 act

18:47

<u>82:45</u>



File: >11026 Scan #: 84 Retn. time: 5.06

をおくない ないかい いっこうしょ

n/z	Int.				Int.				
40.90	.506		731		1.724		2 642		R 115
50.10	11.132				.712				
51.10					2.061				
					1.106				
53.20	. 394	99.00	2.474	142.95	. 937	196,90	. 937	255.90	4,948
\$5.10	. 787	101.00	1.780	145.95	.506	198.00	100.000	257.90	2.399
56.00	1.462	104.09	1.124	146.95	1.162	199.00	6.222	273.00	1.368
57.00	3.786	105.00	1.087	148.05	-2.321	204.00	3.130	274.05	3.092
62.10	.712	106.20	.731	148.85	.513	205.00	1.235	275.05	16.829
63.10	1.612	107.00	10.907	151.45	.431	206.10	17.672	276.05	2.230
69.00	59.445	108.00	1.668	155.05	.881	207.10	4.741	276.95	1.274
74.00	3.298	110.00	33,115	156.05	1.387	208.10	1.237	280.95	.768
75.10	6.672	111.00	4,498	160.95	1.068	208.90	. 187	295.95	4.329
76.10	2,380	116,10	.918	165.05	.787	210.50	.600	303.05	.412
77.10	16.645	117.00	6.897	167.05	3.936	211.00	.813	323.05	1.555
78.10	3.467	118.05	.600	168.05	-2.024	217.00	5.097	351.95	. 581
79.00	3.111	123.05	1.387	173.95	.731	221.00	6.484	365.00	1.630
80.10	2.305	125.05	.581	174.95	1.499	223.00	1.349	372.00	.731
81.10	3.561	127.05	15,390	177.95	.656	224.00	9.839	122.90	2.605
82.00	1.031	128.05	3.411	178.95	.2.999	225.00	2.305	441.05	6.241
83.10	1.087	129.05	19.584	180.05	• 1.949	227.00	3.673	442.05	45.877
85.00	.618	130.05	1.987	185.05	1.331	229.00	1.049	443,05	9.070
85.90	.637	132.05	.581	186.05	10.701	242.00	.431	443.85	.562
91.00	.806								

Case Ho:	Calibration Date: 10/26/88						
Contractor: ENDINEERINE - S	CIENCE	line:	12:43	•	,		
Contract No:	· ·	Laboratory ID: >50241					
Instrument ID: 1	-Initia	l Calib	ratio	n Date	: 10/13/8 54.5)	
Minimum RF for SPCC is	· .	· Haxır	oun X Di	ff fo	r (((i5 X	
Conpound	RF :	RF	XOnff	ccc	SPCC		
	1.03431						
	1.05155				•		
Di-n-Butylphthalate							
1,4°-Dibronobiphenyl	-		-				
•	1.19047	1.12552	5.46	¥			
Heptachlor Cpoxide	-	-	•				
Endosulfan 1	-	-	-				
1,4'-000	•	•				•	
Dieldrin		•	-				
Endrip		-					
4,4'-000	-	-					
Endosulfan II	-	-	-				
Endrin Aldehyde	•	-					
4,4*-601	•	-	-				
Endosulfan Sulfale	-	-	-				
Dibutylchlorendate	•	-	-				
Benzidine	.04023	.05211	29.53				
Pyrene	1.56086						
Terphenyl-d14	1.05835	.21176	14.50				
Butylbenzylphthalate	1.03390	.19497	15.58				
3,3'-Dichlorobenzidine	.13689	. 20906	52.72				
Chrysen:	.99655	. 02965	3.32				
Benzo(a)Anthracene	1.10107	.09279	1.02				
bis(2-Ethylhexyl)Phthalate	1.21073 1		24.37				
Di-n-octylphthalate	3,40275	3.63348	6,78	*			
Benzota)Fyrene	1.32098		2.43				
Benzo(b)Fluoranthene	1.60850 1		12.32				
Indeno(1,2,3-cd)Pyrene	.96800	.95838	.99				
Dibenzo(a,h'Anthracene	.87481		13.41				
Benzo(1)Flucranthene	1.44370 1	. 45936	1.09				
Benzo(g,h,1)ferylene	. 89761		10.38				

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

 $^{{\}tt XO:ff-X}$ Difference from original average or curve

CCC - Calibration Check Compounds (4). SPCC - System Performance Check Compounds (40)

Contractor: ENGINEERING.	SIGNIE	Tine:	12:43			
Contract No:		Labora	tory 10	:)\$	0241	
Instrument 10: 4		Initia	ol Calibo	rati	on Date: 1	0/45788 Pag
		•	` · · · `			
Minimum RF for SPCC is	5	Maxir	iun I Di	ff f	or CCC is	X
Conpound	<u>r</u> r	ĸ	XO) (f	CCC	SPCC	•
Hexachlorocyclopentadiene	. 29568	.34157	15.52		##	
2,4,6-Trichlorophenol	, 12280	.38541		Ħ		
2,4,5-Trichlorophenol	.52897					
2-Fluorobiphenyl		1.14341				
2-Chloronaphthalene	1.23784	1.16327	6.02			
2-Hitroaniline	:47288	.46742	1.16			٠
Dinethylphthalate	1.40629	1.32280	5.94			
2,6-Dinitratoluene	.37415	. 37925	1.36			•,
Acenaphthylene	1.68918	1.55205	8.12			
3-Mitroaniline	.44557	. 44366	.43			
2,4-Dinitrophenol	.11898	.10650	10.49		FR 1	
Acenaphthene	1.13011	.94937	15.99	ı		
Dibenzofuran	1.64131	1.52395	7.15	•		
2,4-Osmstrotoluene	. 28418	.27622	2.10			
1-Nitrophenel	. 28450	.18722	34.19		HX	
fluorens	1.12850	.94323	16.42			
Diethylphthalate	1.20339	1.05551	12.72		•	
4-Chlorophenyl-phenylether	,59183	.54564	7.81			
4-Mitroaniline	.35956	.33292	7.41			
2,4,6-Iribronophenol	.21023	.20763	1.24			
1,2-Diphenylhydrazine	-	-	•			
Alpha-BHC	-	-	-			
Beta-BHC	-	-	•			
Garna-8HC	-	-	•			
Delta-BHC	-	-	-			
Heptachlor	-	•	-			
Rldrin	•	•	-			
M-Hitrosodiphenylanine	.40286	.47679	18.35	•		
1,6-Daritro-2-Hethylphenol	.10514	-	•			
1-Bronophenyl-phenylether	. 21301	.24487	14.96			
Hexachlorobenzene	.26273	.30863	17.47			
Pentachlorophenol	.14536	.12614	13.22	¥		

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**) .

Case No:	Calibration Date: 10/26/88
Contractor: ENGINEERING - S	Science Tine: 12:43
Contract No:	Laboratory 10:)50211
Instrument 10: 4	Initial Colibration Date: 10/4/88
Hininum RF for SPCC is	Maximum X Diff for CCC is X
Conpound	RF RF XOLFF CCC SPCC
N-Hitroso-Dinethylamine	.90169 .90823 .72
2-Fluorophenel	1.15802 1.30038 -12.29
bis(2-Chloroethyl)ether	1,11892 .99021 11,50
Phenol	1.41657 1.47123 3.86
Phenol-dS	1.22488 1.38963 13.45
Aniline	.54193 .62826 15.93
2-Chlerochenel	1.23175 1.35004 9.60
1,3-Dichlor obenzene	1.47535 1.43172 2.96
1,4-Dichlorobenzene	1.40530 1.39856 1.19 *
Benzyl Chloride	
Benzyl Alcohol	.72906 .01265 11.47
1,2-Dichlorobenzene	1.32240 1.43758
2-Methylphenol	1.17367 1,1672755
3-8-4-Helhylphenol	1.07139 1.38639 29.40
bis/2-chloroisopropyl)[ther	2.15627 2.38670 10.69
N-Mitroso-Gi-n-Propylanine	.84050 .72436 13,82
Hexach]oroelhane	.53840 .56165 1.32
Dibromochloropropane	• • •
Hilrobenzene	.40312 .44408 10.16
Hi trobenzene-dS	.39137 .40730 4.07
2-Nitrophenol	.24657 .26166 6.12 *
Isophorone	.74170 .80943 - 9.13
bis(2-Chloroethoxy)methane	.49386 .51469 4.22
2,4-Dimethylphenol	.34849 .40522 16.28
Renzoic Acid	.29725 .27525 7.40
2.4-Uschlorophenol	.56733 .61081 7.66 .
1,2,4-Trichlorobenzene	.36913 .36032 2.39
Naphthalene	.91589 .90284 4.55
4-Chloroaniline	.36309 .39808 9.64
Hexachlorobutadiene	.20283 .20322 .19 *
4-Chloro-3-Methylphenol	.31360 .35119 13.01 *
2-Methylnaphthalene	.\$6397 .\$966\$ 5 <i>.</i> ?9

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration form VI

ID:ff - I Difference from original average or curve

CCC - Colibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Lab Name:	Engineery	19 Science		Contract:_	$O(\sqrt{\varphi})$		
Lab Code:		Case No.:		SAS No.:			-,,
	e No. (Stand	C		•		nalyzed:_/	
Lab File	ID (Standar	d):	2241	<u>. </u>	Time A	nalyzed:	10.4
(nstrumer	t ID: \		· .				
1		IS1(DCB)		IS2(NPT)		IS3(ANT)	
ļ	ļ	AREA #	RT	AREA #	RT	AREA :	RT
ļ	12 ·HOUR	/ ^ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	#=====	0,000	10 B	127/6/2	1821
	STD	60975	9.24	212309	10.00	12765le	18.34
	UPPER		~	======== 	=====	~~~	======
İ	LIMIT	121950	1 4.74	424406	13.36	255312	18.84
	=======================================	========	=====	========	=====		
	LOWER	30488	8.74	106152	12.36	67828	17.89
		=======	=====	=======	=::=== =	D=======	:=====
	EPA SAMPLE			1			
_		 =========	=====		======	======================================	
5 cox 2 01	88092357.54	64680	4.22	1	1225	136555	18.32
	8809-22-57	53511	9.23	202436	12.85	111232	1_(0, 98
	88093357-59 34.	5 51681	9.24	195929	12.86	106988	18.34
4 7 05	8092157-59 BUK-	12 57597	19,22	219566	12.84	120733	18.33
	188081967 ms	1 65312	1 9.24 1 9.22	1 242311	12.83 12.83	129984	18.33
	88081982	80925	9.23	305478	12.83	172761	18.34
- /	88692537 BARA		9.23	193379	12.84	113396	18.33
F/ 13	880 92358 ACRA	54271	923	173996	1285	109001	18.34
	8092357-5166		9.23	189412	12.85	114172	(8.34
	28081871 Gal		9.24	245371	12.86	137535	1 18.35
	85081873 6-0		1 9.23	249664	12.84	145220	
5,4 I.4 15	1 S8081873 Lane	70639	9.22	253745	10.21	179017	1 - 1 41./1
15	•						
17	·	!					
13	·)	i				1
19	·						1
20			1	1			·
21	·	1	!	.!	!	ļ	<u> </u>
22		<u> </u>	<u> </u>	<u> </u>	1 TTT	\ MIT = + 10	0% 5-
IS1 (DCB) = 1,4-	Dichlerope	nzene-d	14 U	PPER LI	MIT = + 10 standard	area.
152 (NPT) = Naph	ob-base-4	c	1 7	UMED IL. MESTHET	Standald $MIT = -50$	5 of
153 (.	ANT) = Acen	aphinensad	G	· ·	nternal	standard	area.
				**			

2293 VIII SV-1

page __ of __

10,3

Lab Name:	: Engineer	ng Science	*	Contract:	ORØØ	61	14 2 3
Lab Code:	•	Case No.:		SAS No.:		סא פסר	
Sampl	le No.(Stand	lard) : 55T	D Brod		Date A	malyzed:	0/26/88
Lab File	ID (Standar	:d):S	2241		Time A	unalyzed:	12:43
Instrumen	nt ID: \			• • •			
		IS1 (DCB) AREA #	RT	IS2(NPT) AREA #	RT	IS3 (ANT) AREA	RT
	12 HOUR STD	60975	9.24	212303	12.86	127656	18.34
	UPPER	121950	9.14	424606	13.36	255312	18.84
	LOWER LIMIT	30488	8.74	106152	12.36	43828	17.84
	EPA SAMPLE NO.			 =======		*======	======
ü3 02	88092357-54 825 188092357-54 825 mg	64680	9,22	253048	12.85	136555	18.32
46 04 47 05	88081967 MS		9.24	195929 219566 305337	12.84	106988	18.34
4 9 07 ∫ 5 9 03 ∫	8808 1967 - 50 8808 1982 8809 2537 BNEA	80925	9.23 9.23 9.23	343311 365478 193379	12.87	129984 172761 113396	18.34
か 製 三	88692357-51666 8092357-51666	<u>54277</u> #55930	9.23	182415	12.85	114172	18.34
ss l 13;	8:08:1873 6-11 808:1873 6-11	70514	9.23	249664	12.84	146694	18.33
16 17 18							
19 20 21							-
22 IS1 (1 IS2 (1	OCB) = 1,4-1 $OCB) = Napht$	ichlorober halene-d8 aphthene-d8		i	nternal	IT = + 100 standard a	erea.
•	ANT) = Acena	-		iı	nternal	standard a	rea.

229Å ORM VIII SV-1

page __ of __

Lab Name: Engine	enny Scie	nce	Contract:	ORØ	<u>ø1</u>		Š
Lab Code:	Case No.:		SAŠ NO.:		_ Job No.	} <u> </u>	
Sample No.(Stan	dard): 557	D DOG	•	Date 1	Analyzed:	10/26/	88
Lab File ID (Standa	. 9	0241			Analyzed:	12:4	
Instrument ID:			• •				
1	IS4(PHN)	<u> </u>	IS5(CRY)		IS4 (PRY)		1
	AREA #	RT		RT	AREA #	FT	
12 HOUR STD	181647	22,99	113883	31,47	76129.	37.64	
UPPER LIMIT	363294	23,49	227766	31.97	152258	38.14	
LOWER	90824	22,49	56942	30,97	38065	37,14	
EPA SAMPLE NO.			=======================================				
12 01 88092357-51 MS 13 02 88092357-59 AC CO	† 188084 \$ 157433	22.99 23.99	109 407 75621	31.50	6 (085 40006	37.66 37.70	-0.
46 04 8809.7357-59 PCC } 42 05 8809.7357-59 PCC }	4 188750	23,05	86087 92733	31.53 31.52	43117	37,71 37,69	701
48 05 88081967 ms	162992	23.01	1 61612 1 85242 1 147901	31,47	3830* 33721*	37,66	
59 63 8808 1982 53 63 8808 1982		23.01	91062	31.49	40866	37.68	
\$109 2 58 ACRA 801 3357-59 ACRA	168688	23.02	95474	31.50	49866 51241	37.67 3770	l İ
54 12 1808 1871 6 LL	196786	23.04	107903	31.51	39503 45211	37.68	<u> </u>
Su 1: 8108 1873 6m		23,01	106986	31.49	53328	37.66	ı
15;							ı
17	. [·i	:
			h.				
		, ———					<u> </u>
22! Is4 (PHN) = Phen		<u> </u>			i <u> </u>		1
	rseme-dll Pleme-dll		3:	: inter: :VER LI	nal standa: MIT = - 50%		,
1	٠		a:		nal standar	d area.	,
# Column used to	flag ințe	cmal st:	andard area	: Values	s with an a	sterish	:
bage — og —		Fori	VIII 2 -1		•	13),*5 £

. 2295

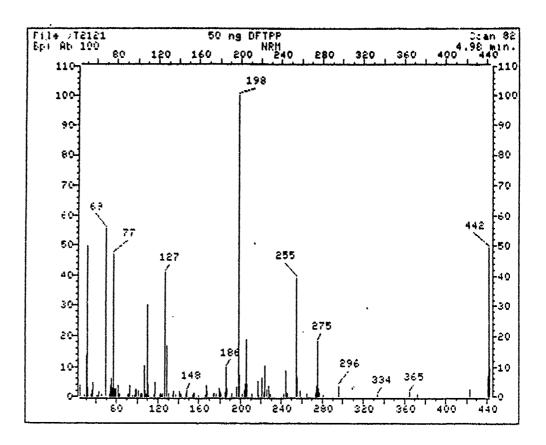
5B SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: Engineering Science	Contract:
Lab Code: Case No.:	SAS No.:
Lab File ID: >T2121	DFTPP Injection Date: 11/21/88
Instrument ID: 70 1	DFTPP Injection Time: 15:22
i	: % RELATIVE : ABUNDANCE :
1 51 : 30.0 - 60.0% of mass 198	49.6 0.0(0.0)1 55. 0.0(0.0)1 40.9 0.0 100. 7.1 18.2 98 1.71 443 6.7 98 49.4 9.5(19.3)2
I-Value is % mass 69	2-Value is % mass 442 5 Por 0
THIS TUNE APPLIES TO THE FOLLOWING S	SAMPLES, MS, MSD, BLANKS, AND STANDARDS:
LAB SAMPLE ID	LAB DATE TIME FILE ID ANALYZED ANALYZED

•	′ 						
1	LAB	1	LAB	1	DATE	TIME	ı
ł	SAMPLE ID			į	ANALYZED	ANALYZED	į
:	****************	!==		=			,
011	80 ug/ml BNA STD	ł	>50561	1	11/21/88	15:40	
021	88092881 AC 1ml + IS	ł	>50562	į	11/21/88	16:42	Janot
03:	88092981 BN 1ml + IS	;	>50563	;	11/21/88	17:41	PA
041	88081939-2378 RE-EX	1	>50564	ŀ	11/21/88	18:40	- 1
05:	88081939 REX 1m1 +15	1	>50565	ŧ	11/21/88	19:39	
061	88081968 REX 1ml +IS	1	>50566	;	11/21/88	20:39	
07:	88021970 REX 1ml +15	1	>50567	!	11/21/88	: 21:39	į
081	88081971 REX 1ml +IS	!	>50568	:	11/21/88	22:38	
09:	88081975 REX 1m1 +15	!	>80569	i	11/21/88	23:37	· -
10:	88082374 REX 1ml +15	i	>30570	1	11/22/88	0:36 T	ane
111	88082378 REX 1ml +1S	1	>\$0571	1	11/22/88	1:35	BA
121	88082296 REX 1ml +15	1	>SØ572	i	11/22/88	لِ 2:35 . ا	۳ لـ
13:	<u> </u>	.		!_		l	,
14;	ļ	.1_		1 ~	·		!
151	I	.1		1_		l	
161		_ا.		1_	·	l	:
	<u> </u>	.1		1_		 	
	I	.:_		1_			
	<u> </u>	.		1_		l	Í
		.		1_			
211	11	!		١_			ĺ
	11	.		.!_			ı
1 0	of 1						

page 2296 FORM V SV

1/87 Rev.



File: 12121 Scan #: 82 Retn. time: 4.98

n/z	. Int.	n/z	Int.	n/2	Int.	n/2	Int.	h/2	Into
14,10	3.786	91.10	.866	128.15	2.868	181.05	1.064	229.10	.758
49.00	.722	92.10	.776	129.05	16.504	185.05	1.389	242.10	.649
50.10	13,258	93.00	3.824	130.05	1.046	186.05	9.722	244.20	8.550
51.10	43.639	95.80	.541	133.95	.379	187.05	2.706	245.10	1.046
52.10	3.036						1.064		
55.10	.722	98.10	2.345	137.15	.740	196.10	3.193	255.10	39.051
56.10	2.074	99.10	2.471	141.05	1.876	198.10	100.000	256.10	6.439
57.10	4.726	100.90	1.948	141.95	.667	199.10	7.107	258,00	2.128
61.10	.559	103.10	.866	143.05	.649	201.60	.613	265.10	.685
62.20	.577	104.10	.956	146.95	1.136	204.00	1.948	273.10	1.190
£3.00	1.623	105.00	1.118	148.05	2.110	204.20	1.966	274.15	3.301
65.20	.830	107.10	10.335	154.05	. 433	205.10	4.203	275.15	18.236
69.00	55.375	108.10	1.948	155.15	.992	206.10	18.579	276.05	2.922
73.40	.631	108.60	.613	156.05	1.263	207.10	4.076	277.05	1,497
74.20	3.824	110.00	30.032	160.05	.559	211.20	. 884	281.15	.577
75.10	6.079	111.10	4.149	166.05	.541	217.10	5.141	296.05	3,499
76.10	2.633	111.80	.415	167.05	3.878	218.00	.487	334.05	.685
							6.187		
							1.299		
							10.281		
60.10						225.10	2.309	441.25	6.728
81.10			.577			227.10	3.355	442.25	49.369
82.00			1.082	180.05	1.750		.812		9.542
83.00	1.010	127.05	40.873				556	17	

Lab Name: Engineer:	ing Science	Contract:	*******
Lab Code:	Case No.:	SAS No.:	SDG No.:
Lab File ID (Standa	ard): >S0561	Date	Analyzed:11/21/88
Instrument ID:	70 1	Time	Analyzed: 15:40
•			
1	I AREA # I RT	I AREA #1 RT	IS3(ANT) AREA # RT
1 12 HOUR STO	92801. 9.12	1 308578. 12.7	74 203487. 18.21
UPPER LIMIT	185602.	1 617156. 1	406974.
LOWER LIMIT	45400. 1	1 154289. 1	101743.
SAMPLE I		1 , 1	
01:88092881 AC 1 02:88092881 BN 1 03:88081939-2371 04:88081939 REX: 05:88081970 REX: 06:88081970 REX: 07:88081971 REX: 08:89081975 REX: 09:88082374 REX: 10:88082373 REX: 11:88082276 REX: 12:	16804.*! 9.11 81069. 9.10 74856. 9.09 74614. 9.09 74006. 9.09 76251. 9.09 71196. 9.09 70587. 9.09 73017. 9.09 69175. 9.10 74558. 9.10	62446.* 12.8 287886. 12.7 31 284529. 12.8 31 278247. 12.8 31 270569. 12.7 31 268908. 12.8 31 265719. 12.7 31 277643. 12.8 31 259891. 12.8 31 268047. 12.8	32: 43508.*: 18.21 72: 160990.: 18.20 69: 172575.: 18.18 69: 157023.: 18.19 70: 145358.: 16.18 70: 158620.: 18.18 69: 149113.: 18.18 69: 147292.: 18.18 69: 139193.: 18.17 69: 105499.: 18.19
201			

IS1 (DCB) = 1,4-Dichlorobenzene-d4

UPPER LIMIT = + 100%

IS2 (NPT) = Naphthalene-d8

of internal stansard area.

IS3 (ANT) = Acenaphthene-d8

LOWER LIMIT = -50% of internal standard area.

Column used to flag internal standard area values with an asterisk

page 1 of 1

Lab Name: Engineering Sc	ience	Contract:	_,
Lab Code: ES01 Cas	se No.:	SAS No.:	SDG No.:
Lab File ID (Standard):	>50561	Date	Analyzed:11/21/88
Instrument ID: 70	1	Time	Analyzed: 15:40

	S4(PHN)		ISS(CRY)	1	IS3(PRY)	· ·
1	AREA #1		AREA #1		AREA #1	
12 HOUR STD!			238128.			
UPPER LINIT			476256.		324414.	-
UPPER LIMIT;						
; LOWER LIMIT;			119064.		81103.	
22222222222					========	=====
I EPA SAMPLE I	1			! !		1
1 NO. 1	ł					
=====================================	•					•
Ø1188092881 AC 1						
02188092881 BN 1						
03168681939-2371	277500.					
04188081939 REXI		22.83				
05:88081968 REX: 06:88081970 REX:	232911. H					
07188081971 REXI	231964.				· -	
08:8808:975 REXI	231079.					
09188082374 REXI		22.83				
10188082373 REXI	230468.	22.85	162546.	31.27	105150.	37.27
11188082296 REXI	229175. 1	22.85	114497.*	31.29	5605.*	37.36
1211_						
131!_						
141						
15!						
161						
171 101 _						
19:						
201						
211!_	·-,				·	
221			I		l	l

```
IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal stansard area.

LOWER LIMIT = - 50%

of internal standard area.
```

page 1 of 1

William Colon of the Colon of t

[#] Column used to flag internal standard area values with an asterist

BE/MS TUHING AND MASS CALIBRATION

Decafluorotriphenylphesphine (DFIPP)

Case Ho. 123456

Contractor Engineering Scien Contract Ho. 99999999

Instrument ID II

Dale / Time 10/26/88 9:32

lab 10 >01026::01

Data Release Authorized By: Jaura

n/Z	1 ION ABUNDANCE CRITERIA	}	XRELATIUS	ABUNDANCE
<u></u>	1 30.0 - 60.0% of mass 198	' !	49.38 OX	
58	lless than 2.0% of mass 69	:	0.00 OX	(0.00) #1
69	l mass 69 relative abundance	;	68.40	
70	l less than 2.0% of mass 69	1	0.00 DK	(0.00) #1
127	1 40.0 - 60.0% of mass 198	-	42.09 OX	
197	l less than 1.0% of mass 198	i i	0,00 OK	
199	I base peak, 100% relative abundance	!	100.00 CK	
	1 S.O - 9.0% of mass 198	1	6.88 OK	
275	1 10.0 - 30.0% of mass 198	1	21,98 OY	
365	l greater than 1,00% of mass 198	!	1.57 (0)	
	I present, but less than mass 443	;	11.95 OF	
	I greater than 40.02 of mass 198	;	91.51 OK	
	17.0 - 23.0% of mass 442	1		(18, 47) 12
	1	1	2177	

590/2/3

THIS PERFORMANCE TUNE REPLIES TO THE

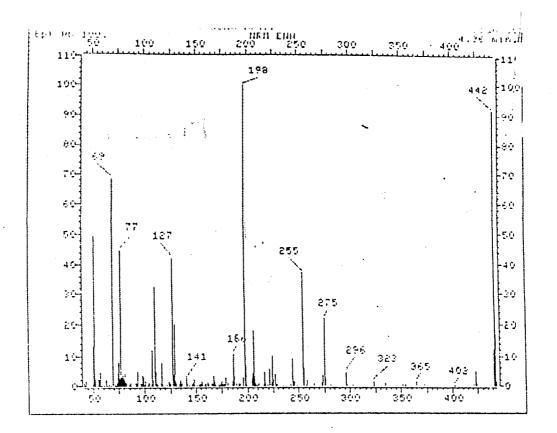
FOLLOWING SAMPLES, BLANKS AND STANDARDS.

11 - Value in parenthesis is I mass 69.

#2 - Value in parenthesis is % mass 442.

ISREPLE IOI	LP9_10		TIME_OF_AHALYSIS_!
150% 61 HTT :	>01026	110/26/881	9:321
160mg/L	E5963	!!	10:04
18105/939 1	E5970	!	17:00 :
188081968	E5971	1	17:55
123081918	E5732	1	18.20
1 8103/9.70	E5973	·	19.45
1 58 081971	E5974	1	30.40
1 88081972	ES975		21:35 1
183081923	E59.76		22:30 1
			1
,		1	!
1) 1	1	
!			
The second secon		· · · · · · · · · · · · · · · · · · ·	*
-	'	· [*] , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	·

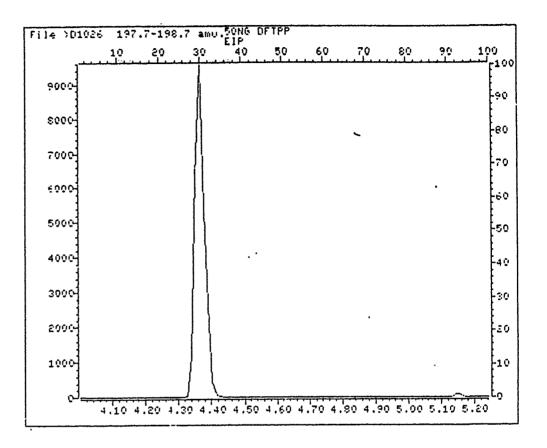
Sout Is out, not eade Sout Ker good , we Sout Ker bed, we Sout Ker bed, we Sout of the time, hother



File:)01016 Scan t: 30 Retn. time: 4.36

n/I	Int.			n/I	Int.	n/z	Int.	n/z	Int.
								240.00	***
				137.05					
	.132			140.95				251,00	
43.16	1.616						.537		
f5.00	.155			142.95					
43.10	. 301	96.10	.719	145.95					
59.00	13.012	97.10	.711				100.000		
51.10							6,877		
				148.95					
53,00	. 249	93.90	.503	151.15					
		101.00					.197		
55.10	2,391	102.10	. 095	153.95	. 460	203.95	2.386	275.00	21,980
				154.95			4,115		
57.05	4,627	103.90	.911	156:05	1.508	205.95	17.868	276.85	1.217
57.95	.141	104.90	1.212	157.15	. 319	206.95	3,082	280.95	. 352
58.85	.094	106.00	. 156	158.95	. 362	207.95	. 705	282.95	.070
69.95				159.95			. 221		
63,05	2,104	100.00	1.851	161.05	. 930	210.15	. 409	296.95	.404
63.95	.083	110.00	32.347	161.95	. 287	210.35	. 329	302.95	. 165
65, 65	.653	111.00	4, 387	164.95	. 868	210.95	.761	322.90	1.578
67.05	. 479	112.00	.658	165.95	.686	215.85	. 287	323.90	. 235
68,95	68.395	113.00	.272	166.90	3,274	216.95	4,444	326,90	.033
70.95	.789	116.00	. 850	168.00	1.536	217.95	.672	334.00	.831
71.95	.056	117.00	7.399	168.90	. 334	218.95	. 451	351.85	.267
73.05	1.033	118.00	.551	171.90	.272	220.95	5, 421	352,95	. 221
74.05		122.00		172.90			. 963		. 395
74,95	7,840	123.00		174.00	, 620	223.95	9.771	361.95	1.574
				175.00			2.175		
77.65		125.00		175.90			- 3,744		

78.05 2.870 127.00 42.089 177.00 .658 227.85 .404 402.90 . 202 78.95 3.767 128.00 3.396 177.80 .291 228.95 .050 120.90 .521 79.95 2.588 129.00 19.927 178.90 2.917 230.95 .249 423.00 4.674 81.05 1.087 129.95 1.827 180.00 1.203 234.85 .169 423.95 .921 82.05 1.080 130.95 .883 180.90 1.029 241.90 .413 440.95 11.946 83.05 1.550 132.95 .207 185.00 1.527 243.90 8.831 441.95 91.512 _ 84.05 .498 133.95 .662 186.00 10.565 245.00 1.297 442.95 16.906 65.05 .669 134.95 1.823 187.00 3.133 245.90 1.325 443.95 1.550 86.05 1.065 135.55 .648



Title: 0 625 RCID RND BRSE/MEUTRRLS + ETPHENOL, DNS8P82-HO2-4-MEPH Calibrated: 881013 04:31

Check Standard Oata File:)[5963 Injection line: 884026 10:04

Compound	<u> </u>	RF -	10:01	Calib Meth	
K-Hitroso-Ginethylanine	1.24043 1	. 25389	1.08	Average	
2-fluorophenol	1.41912 1	.46850	3.48	Average	
bis(2-Chloroethyl)ether	1.41737 1	.37102	3.27	Average	
Flenel	1.70209 1	.78609	.22	Average	
Phenol-dS	1.35470	1.22738	9,40	Average	
Aniline	.74553	.78717	5.59	Average	
2-Chlorophenol	1.32099	1.37539	4.13	Average	
1,3-Oschlarabensene	1.51101	1.44846	4.14	Ruerage	
1,4-Dichlerobenzene	1,51574	1.41851	6.41	Average	
Benzyl Chloride	•	•	-	Average	
Fenzyl Alcohol	.56944	.62510	9.77	Average	
1,2-Dichlorabenzene	1.45179	1.48567	2.33	Average	
2-Methylphenol	1.42392	1.53160	7.56	Average	,
3-6-4-Methylphenal	1.58422	1.49422	5.68	Average	(Conc=60.00)
bisC-chloreisopropyDEther	2.35722	2,58003	13.69	Average	
K-Mitioso-Oi-n-Propylamine	1.13410	1.40585	23.96	Average	
Hexachloreethans	.70056	.67830	3.18	Rverage	
Dibromochloropropane	-	-	-	Average	
Kilrobenzene	.56683	.54361	3.04	Average	
No triobenzenerdS	. 49938	.53295	6.77	Average	
2-Matrophenal	.22010	. 24583	11.54	Ruerage	
Trapher cre	.67207	.99600	14.21	fluerage	
bis(2-Chlorcethory)methane	.58240	.62014	6.53	Rverage	
2,4-Dimethylphenol	.40862	. 43646	5.3	Average	
Benione Frid	.29595	. 26623	10.0	. Average	
2,4-bichlorophenol				Average	
1,2,4-Teachlorobenzene	.31739	. 33559	5.7		
Sightholese	J9196.	.95037	3.27	Rverage	
4-Chlorosmiline	.33116	₹.40350	21.8	Average	
Perachlorobutadiene	.18652	.17677	5.23	Average	
4-Chloro-I-Methylphenol	. 28631	. 29560	4.2	Average	
I-Methylpaphthalene	.54468	.54865	.7	3 Average	
He washisrosyclopentadiene	. 33763	.3155?	5.2) Average	
2,4,6-Irichlarophenal	. 32295	. 34822	7.8	? Ruerage	
2,4,5-Trachlorophenal	. 49539	.52352	6.8	3 Average	
2-Fluorobipheryl	1.26699			7 Average	
2-Chloropaphthalene	1.24653			O Average	
2-Milroaniline	.63123	. 64596	2.3	C'Rverage	
Ginethylphthalate	1.33033	1.26669		8 Average	
2,6-Dinitratatuene	.31816	. 37232	17.0	2 Average	

FF - Pespanse Factor from daily standard file at 60.00 mg/L

ff - Average Pesponse Cactor from Initial Celibration

Will - 2 Difference from original average or curve

Calibration Check Report

Title: 0 625 ACID AND BASE/MEUTRALS + ETPHENOL OHSBAGE-HOS-4-MEPH

Calibrated: 881013 04:31

Check Standard Data File: 205963
Injection line: 881026 10:04

Conpound	RF .	RF	roiff	Calib Mell
Acenaphthylene	1.65820	1.43814	13.27	Average
3-Hitroaniline	.63702	.67801	6.43	Rverage
2,4-Dinitrophenol	.05753	. 06652		Average
- T	1.12644	. 93946		Average
Dibenzoluran	1.50204	1.49428		Average
2,4-Dinitrotoluene	.32099			Average
1-Nitrophenol	.18425			Average
Nuorene		1.07233		Average
Diethylphlhalale		1.16840		Average
4-Chlorophenyl-phenylether	, 48214	.40605		Ruerage
4-Hitroaniline	.27495			Rverage
2,4,6-Tribronophenol	.14218			Average
1,2-Oiphenylhydrazine		•		Average
Alpha-BHC	-		-	Average
Beta-BHC	-		-	Rverage
Ganna-RKC	-	-	-	Rverage
Delta-8HC	-	-	-	Average
Heplachler		-	-	Rverage
Aldrin		-		Average
H-Hitrosodiphenylanine	.41983	. 13629	3.01	Rverage
4,6-Dinitro-2-Methylphenol	.08606		-	Average
4-Bronophenyl-phenylether		. 24543	6.91	Average
Hexachlorobenzene	.28768			Average
Pentachlorophenol	.11390			Average
Phenanthrene		1.01549		Ruerage
		1.03724		Rverage
Anthracene Di-n-Butylphthalate		1.83785		Average
4,4°-Dibromobiphenyl	1.71710	1.03103	7, 01	Average
Fluoranthene	1 17569	1.10431	6.07	Rverage
Heptachlor Epoxide	1.11300	-	•	Average
Endosulfan I				Average
1,1'-00[-	-		Ruerage
Dieldrin		-		Average
Endrin				Rverage
1,11-000	_	_		Average
Endosulfan 11			-	Average
Endrin Aldehyde				Average
1.1'-DOI			•	Rverage
Endosulfan Sulfate				Ruerage
Dibutylchlorendate				Ruerage
ninnthicutot tungts		-	<u>-</u>	uver age

FF - Pespense Factor from daily standard file at 60.00 mg/L

ID:ff - I Difference from original average or curve

FF - Average Response Factor from Initial Calibration

Calibration Check Report

Title: D 625 ACTO AND BASE/MEUTRALS + ETPHENOL, ONSBP&2-HO2-4-HCPM Calibrated: 881013 04:31

Check Standard Data File:)E5963 Injection line: 881026 10:04

Conpound	RF	rf	20111	Calib Meth
Benzidine	.03775	.17676	368.27	Rverage
fyrene	1.65647	1,79414	8.33	Average
Terphenyl-dl4	1.09617	1.29902	18.47	Average
Butvibenzelphthalate	1.15097	1.43523		Average
3,3'-Dichlorobenzidine	.12990	. 25115	95.88	Average
Chrysene	1.01423	1.03753	2.30	Average
Benzo(a)Authracene	1.09006	1.24137	13.80	Average
bis(2-Ethylhexyl)Phthalale	1.34247	1.76833	31.72	Average
Di-n-octylphthalale	3.72331	4.35009	16.83	Average
BenzolalPyrene	1.27071	1.23544	2.78	Average
Benzo(b)Fluoranthene	1.46902	1.59508	7.12	Average
Indeno(1,2,3-ed)Pyrene	.82513	. 85244		Average
Dibenzora,h)Anthracene	. 78966	. 01567	3.29	Ruerage
Benzo(k)[]uoranthene	1.51900	1.20932	20.39	Average
Benzo(g,h,1)Ferylene	.74580	.73755	1,11	Average

10:11 - I Difference from original average or curve

PF - Pesponse Factor from daily standard file at 60.00 mg/L

FT - Average Response Factor from Initial Calibration

Lab	Name:	: Engineer	ng Science		Contract:	ORØØ		
					SAS No.:		Job No.:	:
	Sampl	le No.(Stand	ard):		•	Date A	nalyzed:	
Lab	File	ID (Standar	d):			Time A	nalyzed:	E
Ins	trumen	nt ID: \				·· •		O Comments
	. !		IS1(DCB) AREA #	RT	IS2(NPT) AREA #	RT	IS3(ANT) AREA #:	RT
		12 ·HOUR STD	89249	9.01	322385	<u> </u>	182885	
		UPPER LIMIT_	178 498		644770	=====	365770	Constant of the Constant of th
		LOWER LIMIT	44624	 ======	16/192	 ======	9/442	
		EPA SAMPLE NO. =========	==== === ===		t			
	02 03 04	\$30\$1968 \$30\$1969 \$30\$1970	729202 784931 81377 74982 90407	8.04 8.01 8.01 8.01 9.00	529229 293702 312883 303965 316672	11.20 11.20 11.20 11.20	275097 156574 165579 165579	16.97 18.97 18.97 16.97
	05 06 07 08				2/2672	17.77	1	<u> </u>
**	09 10 11							
-	12 12 14 15							
	15 17 18							
	19 20 21							
	IS2 (DC3; = 1,4-	Dichlorobe thalene-d8 aphthene-d	ı	i L	OWER LI	standard MIT = - 50	area. % of
	a coi	umn used to	ofiad inte	ernal st			standard s with an	

2307

FORM VIII SV-1

10/86

page __ cf __

Lab	Name:	Enginee	ing Scie	nce	Contract:	ORD	<u>\$1</u>	
		<i>.</i>			SAS No.:		Job No.:	
	Sampl	e No.(Stand	lard):			Date 1	nalyzed:	•
Lab	File	ID (Standar	:d):			Time A	nalyzed:	
Ins	trumer	nt ID:				•		
	į		IS4 (PHN)		IS5(CRY)		IS4(PRY)	
	ļ		AREA #	TA	AREA #	RT	AREA #	RT
		12 HCUR STD	256091	21.56	144451	2999	99323	3497
		UPPES LIMIT	5/2192		288902		198646	
		LOWER	128045		72725		49662	
		EPA SAIPLE NO.	1					
	01	54081939	434352		294508x	1	1	34.95
•	02 03	53081668	279952	121.55	121889	29.97	72784	3495
	04	58 08/970	1249054	121.56	160354	29.97	1 40223	13495
	05 06	<u> </u>	250791	121.55	166445	3996	9423	34.44
	07 08			1				
	0.5							1
	1:						İ	
	12							1
	13 14					. ———	1	
	15 16	·						<u> </u>
	17							!
	12	No. of control being collections or the collection of the collecti		ļ		*		!
	1							:
	21 22		<u> </u>	İ	<u> </u>	1	41	i '
		PHN) = Phen		10			MIT = + 10	
	I33 (CRY) = Chry PRY) = Pery	12:0:4744 12:0:411		-	OWER LI	nal standa MIT = - 50 nal standa	ŝ
	₹ Cal	umn used to	flag inça	rnal st	andari ara	a value	s with an	asteris!
pag	; e	cf		7072	7222 202		, ,	1:

6C/MS TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFTPP)

Case No. 123456

Contractor Engineering Scien Contract Ho. 99999999

Instrument ID #1

Date / Time 11/07/88 14:36

Lab 10 >01107::03 Data Release Authorized By: ___

n/2	I ION ABUNDANCE CRITERIA	1	XRELATIVE	RBUKDAKCE
51	1 30.0 - 60.0% of mass 198	_;_	53.88 OK	
68	less than 2.0% of mass 69	1	0.00 OK	(0.00) #1
69	l mass 69 relative abundance	1	69,21	
70	i less than 2.0% of mass 69	1	.65 OK	(.9336) #1
127	1 40.0 - 60.0% of mass 198	1	43.91 OK	
197	l less than 1.0% of mass 198	1	0.00 OK	
198	l base peak, 100% relative abundance	1	100.00 OK	
199	1 5.0 - 9.0% of mass 198	1	6.11 OK	
275	1 10.0 - 30.0% of mass 198	1	18.06 OK	
365	i greater than 1.00% of mass 198	ł	1.38 OK	
441	! present, but less than mass 143	į	9.24 OK	
	i greater than 40.0% of mass 198	1	65.21 OK	
	1 17.0 - 23.0% of mass 442	1	12.36 OK	(18.95) 12
	1	1		

10/12/18

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

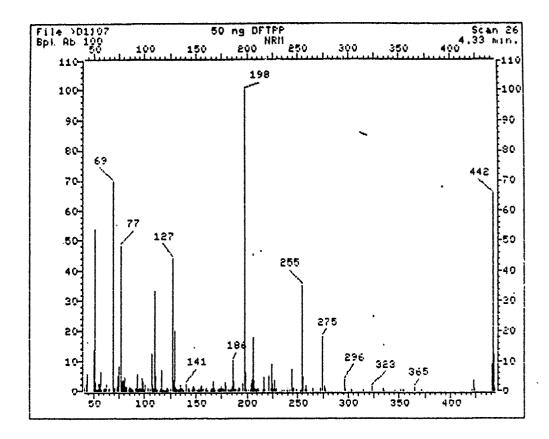
#1 - Value in parenthesis is X mass 69.

12 - Value in parenthesis is X mass 442.

ISAMPLE IDILAB_ID	:_ORTE_OF_RNALYSIS_:	TIME_OF_ANALYSIS	_
150 ng DFTPP D1107	1_11/07/88;	14:36	.1
160mg/Lstd F6116	11/2/81	15:05	_;
191092413 BN : EGIA		16:13	۔ ا رب
1 2614 BN E16/18		17:08] 4
1 2615 BN EG119	11	18:03	_ ,,
1 262BN 1 126/20		18:58	_ ,,
1 2586 BNI E6/21		19:53	_!_
IN 2587 BN F6/22		\$0:48	
(DD 25874N) Elol23		<i>ን</i> ነ: ປ ^ን	<u> </u> 55
184 2622 ACI E6/24		22:38	
BLK 2622.BN! E612'S		<u> </u>	_
2600 AC FUZE	1 1119/17	00:29	۱ _
1 abo an E6/27		01,23	<u>: 3</u>
1820X97Y/OM/ EV128	V	03:13	+5
			_ `

sout, MSOK another progr

ISOUT - not needed



File: >D1107 Scap #: 26 Retn. time: 4.33

n/2	Int.	n/z	Int.	n/z	Int.	n/z	Int.	n/z	Int.
	• • • • • • •			******				•••••	•••••
41.00				140.90					
42.20	.198			142.00			.396		.229
43.10	1.980			143.00			.813		35.025
44.00	5.523			144.00		191.05		255.95	4.940
50.00	13.610			146.00		191.95		257.15	.469
51.00		98.95		147.00			1.012		
	2.730			147,90		195.95		259.05	.292
53.00		100.95		149.10			100.000		
54.00		103.05		151.00		198.90		272.15	
55.10		103.95		151.70		199.90		272.95	
56.10		101.95		152.90		201.60		274.05	2.730
57.10		106.95		153.95			.500		18.060
58.00		107.95		154.95		203.90			1.928
60.00		108.95		155.95		204.90		277.05	
61.0Ò		109.90	33.118	157.05		206.00		277.95	
62.10	.771	110.90		158.05		207.00		281.05	
63.00	1.990	111.80	.646	159.95		208.00		296.00	3,804
64.10	.333	113.00	.333	160.95	1.063	209.00		296.90	.594
65.10	1.209	115.00	.250	161.75	.177	209.90	.323	302.90	,417
66.95	.552	115.90	. 802	161.95		211.00		303.90	.115
68.95	69, 206	116.90	6.836	163.95	.125	211.80	.271	314.80	.302
70.05	.646	117.90	.581	164,85	.677	216.00	.531		.198
71.05	1.198	119.00	. 438	165.95	.616	216.90		323.00	1.323
73.05	1.553	120.00		167.05	3.001	217.80		326.70	.146
74.05		120.70		167.85	1.105	221.00		333.95	.677
74.95	8.106	122.00	.771	168.85	. 354	222.90		331.95	.208
77.05	18.166	122.90	1.251	170.85	. 250	224.00	8.962	340.85	.188
78.05	3.085	123,90	.552	171.95	.417	225.00	2.334	345.95	.167
78.95	3.877	124.90	.698	172.95	.604	226.10	.333	351.85	.375
80.05		126.90		173.95		226.90		352,95	. 281
•• ••			• • • • •	.,	,	*** **			• • • •

```
.686 228.90 1.011 355.05
82.05 1.282 128.90 - 20.040 175.95
83.05 1.480 129.90 1.501 176.85
                                  .886 230.80
                                               .219 365.05 1.376
                    .823 177.85
      .667 131.00
                                 .333 234.90
                                               .240 371.90
85.05 1.334-132.00
                    .438 178.85 2.626 236.90
                                               .250 420.85 .427
                                               .167 422.95 3.554
85.95 1.073 133.00
                    .417 179.95 1.688 238.90
       .636 133.90
                   .438-180.95
                                 .927 240.00
                                               .198 423.95
66.95
87.65
      .261 135.00 1.772 181.95
                                  .250 241.85
                                              .448 440.95 9.243
88.85 .219 135.90
                    .782 183.05
                                 .396-243.95 7.128 442.05 65.215
      .917 137.00
                    .657 183.95
90.95
                                 .271 245.05 1.136 442.95 12.359
91.95 1.105 137.90
                    .323 184.95 1.271 245.85 1.230 443.95 1.170
92.95 5.471 139.00 .177 185.95 10.150 248.95 .344
```

Case Ho:
Calibration Date: 11/07/88

Contractor:
Iine: 15:05

Contract Ho:
Laboratory ID: XE6116

Instrument IO:
Initial Calibration Date: 10/13/88

Minimum RF for SPCC is

Maximum X Diff for CCC is X

Conpound	RF	RF	XDiff	CCC	SPCC
H-Hitroso-Dinethylamine	1.24043	1.08163	12.80		
2-fluorophenol		1,43506			
bis(2-Chloroethyl)ether	1.41737	1.31603	7,15		
Phenol		1.73300			
Phenol-d5	1.35470	1.54823	14.29		
Aniline	.74553	.53219	28,62		
2-Chlorophenol	1.32089	1.38633	4,95		
1,3-Orchlorobenzene	1,51101	1.56259	3,41		
1,4-Dichlorobenzene	1.51574	1.53092	1.00	Ħ	
Benzyl Chloride	•	-	•		
Benzyl Alcohol	.56944	.41059	27,90		
1,2-Dichlorobenzene		1.58127			
2-Methylphenol	1.42392	1.33571	6.20		
3-6-4-Methylphenol	1,58422	1.41241	10,84		
bis(2-chlorossopropyl)Ether	2.35722	2.53136	7.39		
N-Mitroso-Di-n-Propylamine	1,13410	1.30576	15.14		**
Herachloroethane	.70056	.71417	1.94		
Dibromochloropropane	-	•	•		
Mitrobenzene	.56683	.54865	3.21		
Natrobenzene-d5	:49938	.51302	2,73		
2-Kitrophenol	.22040	.24161	9,63	¥	
Isophorone	.87207	,90844	4.17		
bis(2-Chloroethoxy)methane	.58240	.62186	6.77		
2,4-Dimethylphenol	.40862	.41691	2.03		
Benzeic Reid	. 29595	.31925	7,87		
2.4-Oichlorophenol	.53135	.51710	2,68	#	
1,2,4-Irichlorobenzene	.31739	.33911	6.84		
Maphthalene	.98196	1.01280	3,14		
4-Chloroaniline		.33220			
Hexachlorobutadienz		.19704			
4-Chloro-3-Methylphenol		.31546			
2-Methylnaphthalene	.54468	.56122	3.04		
	•••••				

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check (**)

「最後の一個のないないのないないないないのである。 かない かんしょう かんしょう しょうしょく しょくしょう しょうしょうしょう

for the second of the second of the second s

All the section of th

tion the state of

Constant undered

AND STATES

ANTHORNOUS I

Contractions of London Contraction of the Contracti

Case No:	Calibration Date: 11/07/88					
Contractor:	Tine: 15:05					
Contract No:		Laboratory 10: X6116				
Instrument ID:		Initia	ıl Calib	ratio	on Date: 10/13/88	
a.vin					*************	
Minimum RF for SPCC is	•	Maxin	ium X Dii	ff f	or CCC is X	
Compound		RF			SPCC	
Hexachlorocyclopentadiene					k*	
2,4,6-Trichlorophenol	. 32295	. 38149	18.12	*		
	.49539	.45812	7.52			
2-Fluorobiphenyl	1,26699	1.19734	5.50			
2-Chloronaphthalene	1.24653	1,21802	2,29		•	
2-Nitroaniline	.63129					
Dimethylphthalate						
2,6-Dinitrotoluene						
Acenaphthylene	1.65820	1.57693	4.90			
3-Nitroaniline	.63702	. 59503	6.59		•	
2,4-Dinitrophenol	.05753	.06628	15,21		**	
Acenaphthene	1.12644	1.07466	4,60	¥		
Dibenzofuran	1.50204	1.50669	.31			
2,4-Dinitrotoluene	.32099	, 33944	5.75			
1-Nitrophenol	.18425	.17321	5,99		##	
Fluorene	1.09332	1.10414	,99			
Ozethylphthalate	1.32354	1.27372	3,76			
4-Chlorophenyl-phenylether	.48214	.46318	3.93			
4-Hitroaniline	. 27495	.28139	2.34			
2,4,6-Tribronophenol	.14218	.21269	49.59			
1.2-Diphenylhydrazine	•	•	-			
Alpha-BHC	•	•	-			
Beta-BHC	•	-	•			
Ganna-BHC	•	-	-			
Delta-BHC	•	•	•			
Heptachlor	-	-	-			
Aldrin	-	•	•			
K-Hitrosodiphenylamine	.44983	.47132	4,78	#		
1,6-Dinitro-2-Methylphenol	.08606	•	-			
1-Bronophenyl-phenylether	.22979	.26039	13.32			
Hexachlorobenzene -	.28769					
	.11390	.13882	21.87	#		

Case Noi			Calibration Date: 11/07/88				
Contractor:	*****	line:	15:05	************			
Contract No:		Labora	itory ID:	: >E6116			
Instrument IO:		Initia	l Calib	ration Date: 10/13/88			
Minimum RF for SPCC is		Mayır	iun X Dii	ff for CCC is X			
Contoing	RF	RF	XDiff	CCC SPCC			
Phenanthrene	1.07960	1.00591	. 6: 83	*** ****			
Anthracene		1.07579					
Di-n-Butylphthalate		1.82978					
4.4'-Dibromobiphenyl		-	•				
	1.17568	1.04217	11.36	1			
Heptachlor Epoxide	-	•	•				
Endosulfan I	-						
4,4'-00É	•	-					
Dieldrin		-					
Endrin	-	•	-	•			
4,4*-000	-	•	-				
Endosulfan II	-	•	-				
Endrin Aldehyde	-	•					
1,4'-00T		-	-				
Endosulfan Sulfate	-		-				
Dibutylchlorendate	-	-	•				
Benzidine	.03775	.00065	98.28				
Purene	1.65647	1.55134	6.35				
Terphenyl-d14	1.09647	1.14545	4,47				
Butylbenzylphthalate		1.18772					
3,3'-Dichlorobenzidine	.12990	. 22692	74.69				
Chrysene	1.01423	. 99850	1,55				
Benzo(a)Anthracene	1.09006	1.12008	2.75				
bis(2-Ethylhexyl)Phthalate							
Ox-n-octylphthalate		3.08273					
Benzo(a)Pyrene		1.22065					
Benzo(b)fluoranthene		1.68444					
Indeno(1,2,3-cd)Pyrene		. 59967					
Dibenzo(a,h)Anthracene		.99504					
Benzo(F)[luoranthene	1.51900	. 92950					
Benzo(g.h.i)Perylene		1,00143					

RF - Pesponse Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

XOiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

form VII Page 3 of 3

ab Code:		Case No.:		SAS No.:		SDG No.:	
PA Sampl	e No.(Stand	lard):		٠.	Date A	nalyzed:	**
ab File	ID (Standar	rd):			Time A	Analyzed:	
nstrumen	t ID:				•		
ı		IS1(DCB)		IS2 (NPT)	,	' · · · · · · · · · · · · · · · · · · ·	
		AREA #	. RT =====	AREA # =======	RT	AREA #	RT =====
	12 HOUR STD	131547	4.04		11.55	236280	16.94
	UPPER LIMIT	263694		916490	•		
		65773		229.122	l		
	EPA SAMPLE NO.				522245	=======	=====
01	810926BBN 2614BN	139536			11.52	205368	16.98
03 04	2615 BU	130176 251698 214654	8.01 8.03	459110 895353 782159		230062 435987 377590	1690
06 07	(11)D 2587 RN BU 2612 NC	198749	8.60.	737474 312514	11.52	364466 193243	1694
09 10	2672BN	127260	8.01 8.01	382650 43.2973 313784		200209 227505 160544	16.9
11 12 13	2612BV \$808192410m7		8. D/ 8. OD	3/165)	11.51	144250	16.90
14 15 16							
17 18							
19 20 21							
	CB) = 1,4-E PT) = Napht		zene-d			MIT = + 100	
	NT) = Acena		3	L	OWER LIN	MIT = -508	of

page _ of _ 2315FORM VIII SV-1

10,

Lab Nam	e:			Contract:				
Lab Cod	e:	Case No.:		SAS No.:		_ SDG No.		
EPA Sam	ple No.(Stan	dard):			Date 2	Analyzed:		
Lab Fil	e ȚD (Standa	rd):			Time 2	Analyzed:	•	
Instrum	ent ID:							
		AREA #	RT	AREA #	RT	IS4(PRY) AREA #	RT	
	1 22 110117	312566		 	! !	•		
	!	62532		385798		305826		
	•	156283			•	76456		
	EPA SAMPLE			٠				
. 0	1 880 92613 BN 2 9614 BN	320466 283891	21.57	225 Y30 173487	29.44	120378	34.91	
0 ملحم	3 <u>26/5 AN</u> 4 <u>2586 BN</u> 5 1/5 2582 BN	298661	2150	191948	29.87	126499	34.82	<u> </u>
0	6 1/100 2500 BN 7 1 BUX 2622 AC	267791	21.55	29/223	2997	216601	7485	!
0	8 <u>1614 2622 134</u> 9 1 <u>2622 13C</u> 0 1 <u>2622 13C</u>	316316 205151	21.49	102379	29.86	101842- 115084 137770 576774	34 82 34.84 34.83	1
1	1 26/2 RN 2 8808 1974 /OINE 3	1298661	21.50	19198	29.87	136479	34.82	
<u>_1</u>	4 85092586811 5	621101	21.52	376550	29.90	297793	34.86	! !
1	·							! !
	9							
2	·	 	10	· U	PPER LI	MIT = + 100	\ \}	!
IS5	(CRY) = Chry (PRY) = Pery	sene-d12		L	OWER LI	nal standa: MIT = - 50 nal standa:	k	
# 00	lumm ugad ta	6 7 mm dm4n	enal st					

FORM VIII SV-2

page __ of __

Lab Name: Engineering Science Contract: _____.

SEMIUDLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Code: SAS	No.: SDG No.:
Lab File ID: >D1123	DFTPP Injection Date: 11/23/88
Instrument ID: 70 2	DFTPP Injection Time: 9:36
	: % RELATIVE
m/e ION ABUNDANCE CRITERIA	: ABUNDANCE
51 30.0 - 60.0% of mass 198	l .5
68 Less than 2.0% of mass 69	
69 Mass 69 relative abundance	
1 70 Less than 2.0% of mass 69	1 12.3(86.6)1
1 127 1 40.0 - 60.0% of mass 198	
1 197 Less than 1.0% of mass 198	I 37.3
! 198 ! Base Peak, 100% relative abundanc	e
199 5.0 - 9.0% of mass 198	
275 10.0 - 30.0% of mass 198	! 0.0
365 Greater than 1.00% of mass 198	! 0.00
! 441 Present, but less than mass 443	
442 Greater than 40.0% of mass 198	
1 443 17.0 - 23.0% of mass 442	338427.(107.8)2
1	1.
1-Value is % mass 69	2-Value 15 % mass 442

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

			•	•		
!	LAB	ı	LAB	: DATE	1 TIME	,•
1	SAMPLE ID	1	FILE ID	: ANALYZED	: ANALYZED	;
1			******	=	-	1/
	80 MG/L ABN STD+IS	1	>E6313	1 11/23/88	9:57	
├ 02 :	88092881 AC 1ml REAN	ŀ	>E6314	1 11/23/88	11:10	:
₹ • 03 :	88092632 1ml REANAL.	1	>E6315	1 11/23/88	12:10	i
41041	88092633 1ml REANAL.	1	>E6316	1 11/23/88	13:05	Es out
• 05:	88092681 AC REANAL.	;	>E6317	1 11/23/88	13:59	! good "
05:	88092724 AC REANAL.	:	>E6318	1 11/23/88	14:56	はいっけん
06: 68: 08: 09:	88092456 BN 1ml	į	>E6319	1 11/23/88		1
N Y .08:	88092772 BN REANALYS	1	>E6320	1 11/23/88	16:51	1 te. 0 25
1603	88092558 AC REANALYS	1	>E6321	1 11/23/88		-
	BLK 88092513-16,23-2	1	>E6322	1 11/23/88	18:41	AC 55 9
1111	88092551 BN REANALYS	ł	>E6323	11/23/88		val
121	88092623 AC REANALYS	1	>E6324	1 11/23/88	1 20:30	はいいけん
- 131	88081971 REX REANAL.	ł	>E6325	1 11/23/88		issost, N
141	t	_		_1	1	.1
151					1	1
					1	1
						1
181	11				!	1
191						1
. 201						.1
•		1			1	1
	2317	, ,				1
•	f 1			· · · · · · · · · · · · · · · · · · ·		
,			A11			

FORM U SV

1/87 Rev.

10/12

Case No:	Calibration Date: 11/23/88							
Contractor:		Tine:	09:57					
Contract No:		Labora	itory ID					
Instrument ID:		Initia	al Calib	ratı	on Dat	e: 10 	/13/88	}
Minimum RF for SPCC 1s		Maxie	sun X Di	ff f	or CCC	15	I	
Compound	RF	RF	zóiff	CCC	SPCC			
H-Mitroso-Dinethylamine	1.24043	1.14367	7.80					
	1.41912	1.30684	7.91					
·	1.41737							•
Phenol		1.64344						
Phenol-dS	1.35470	1.54822	14.29					
Analine	.74553	. 38172	48.80					
2-Chlorophenol	1.32089	1.31982	.08					
1,3-Dichlorobenzene	1.51101	1.43340	5.14				•	
1,4-Dichlorobenzene	1.51574	1.53226	1.09	#				
Benzyl Chloride		-	-					
Benzyl Alcohol	. 56944	. 37166	34,73					
1,2-Dichlorobenzene	1.45179							
2-Methylphenol		1.17755						
3-8-1-Hethylphenol		1.25540						
bis(2-chlo-oisopropyl)Ether	2.35722	2.42195	2.75					
N-Nitroso-Di-n-Propylamine	1.13410	1.05281	7.17		**			
Hexachloroethane	.70056	.68472	2.26					
Dibromochloropropane	-	•	-					
Ki trobenzene	.56683	.56579	.18					
Hitrobenzene-d5	. 49938	.50178	.48					
2-Ni trophenol ·	. 22010	6806	21.62	*				
Isophorone	.87207	.88510	1.49					
bis(2-Chloroethoxy)methane	. 582 1 0	.61362	5.36					
2,4-Dinethylphenol	.40862	. 40368	1.21					
Benzoic Acid	. 29595	. 31245	5.58					
2,4-Dichlorophenol	.53135		9.92	*				
1,2,4-Trichlorobenzene	.31739	.32512	2.43					
Maphthalene		1.01560	3,43					
4-Chloroaniline	.33116		1.76					
Hexachlorobutadiene	.18652		6.97					
4-Chloro-3-Methylphenol	. 28631	.28386	.86					
5 M (1 1 1 1 1 1	FAACA	E/000	4.44					

RF - Response Factor from daily standard file at 80.00 mg/L

2-Methylnaphthalene

4.44

.54468 .56888

RF - Average Response Factor from Initial Calibration form VI

ID:ff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:	Calibration Date: 11/23/88					
Contractor:						
Contract No:		Labora	itory ID	: >[6313	
Instrument ID:	••••	Initia	l Calib	 ratı	on Dat	e: 10/13/88
Minimum RF for SPCC is		Naxir	iun I Di	ff f	or CCC	is I
Compound	RF	RF	'XÓiff	CCC	SPCC	
Hexachlorocyclopentadiene	.33289	.31692	4.80		**	
2,4,6-Trichlorophenol	.32295					
2,4,5-Trichlorophenol	. 49539					•
2-Fluorobiphenyl	1.26699					
2-Chloronaphthalene	1.24653					
2-Hitroaniline	.63129					
	1.33033					
2,6-Dinitrotoluene	.31816					•
Acenaphthylene	1.65820					
3-Mitroaniline		.59097				
2,4-Dinitrophenol		.07696			**	
Acenaphthene	1.12644	1.13868	1.09	*		
Dibenzofuran	1.50204	1.53769	2.37			
2,4-Dinitrotoluene	.32099	.34252	6.71			
4-Hitrophenol	.18425	.15925	13.57		**	
Fluorene	1.09332	1.15413	5.56			
Drethylphthalate	1.32354	1.36877	3.42			
4-Chlorophenyl-phenylether		.50126				
4-Hitroaniline		.31503				
2,4,6-Tribromophenol		.14296	.55			
1,2-Diphenylhydrazine	•	-	-			
Rlpha-BHC	-	•	•			
Beta-BHC		•	•			
Garna-BHC	-	-				
Delta-BHC		-	•			
Heptachlor	-	-	•			
Aldrin	•	-	-			
N-Mitrosodiphenylamine	.44983	.47987	6.68	ŧ		
1,6-Dinitro-2-Hethylphenol	.08606	•	•			
1-Bronophenyl-phenylether	.22979	.23459	2.09			
Hexachlorobenzene	.26768		3.01			
Pentachlorophenol		.13672	20.03	#		

RF - Response Factor from daily standard file at 80.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case, No:			Calibration Date: 11/23/88				
Contractor:		line:	09:57	***************************************			
Contract Ho:		Labora		: >E6313			
Instrument IO:		Initia	al Calib	ration Date: 10/13/88			
Minimum RF for SPCC is		Maxir	nun X Di	ff for CCC is I			
Conpound	RF	RF	'XÒiff	CCC SPCC			
Phenanthrene	1.07960	1.02675	4.90	*** ****			
Anthracene	1.13334	1.13577	.21				
Di-n-Butylphthalate	1.71746	1.86982	8.87				
4,4'-Dibronobiphenyl		•	-				
Fluoranthene	1.17568	1.00590	14,44	•			
Heptachlor Epoxide	-	•	•				
Endosulfan l	-	•	-				
4,41-000	-	•	•	•			
Dieldrin	•	•	-				
Endrin	-	•	-				
1,4'- 000	-	•	-				
Endosulfar II	•	•	-				
Endrin Aldehyde	-	•	-				
4,41-001	•	•	•				
Endosulfan Sulfate	-	•	-				
Dibutylchlorendate	• •	•	•				
Benzidine	.03775	.02044	45.86				
Pyrene	1.65647						
Terphenyl-d14	1.09647						
Butylbenzylphthalate	1.15097						
3,3'-Dichlorobenzidine	.12990						
Chrysene	1.01423						
Benzo(a)Anthracene	1.09006						
bis(2-Ethylhexyl)Phthalate							
Di-n-octylphthalate	3.72331		16.91				
Benzo(a)Pyrene	1.27071		1,11				
Benzo(b)Fluoranthene		1.55878	4.68				
Indeno(1,2,3-cd)Pyrene		1.17335	42.15				
Dibenzo(à,h)Anthracene	.78966	.99906	26,52				
Benžo(k)Fluoranthene .	1.51900	1.43481	5.54				
Benzo(g,h,i)Perylene	.74580	.91644	22.88				

RF - Response factor from daily standard file at 80.00 mg/L

RF - Average Response factor from Initial Calibration Form VI

XDiff - X Différence from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Ľãb l	Name: Enginéer	ing Science		Contract: .		•	
Lab. (Code:	Case No.:		SAS No.:		SDG No.: _	<u> </u>
Lab f	File ID (Stand	ard): >E63	13	•	Date Ar	nalyzed:11/2	3/88
Insti	rument ID:	70 2			Time Ar	nalyz ed: 9:	57
	•		_			_	
		IS1(DCB)					
	•			! AREA #		AREA #	
	1 12 HOUR STD	104232.	7.88	347133.	11.38	175830.	16.76
	UPPER LIMIT	208416.	l	694266.		351660.	
	LOWER LIMIT	52116.		173566.		87915.	
	SAMPLE NO.	1 1 1	 	 			
01	188092881 AC						
02	2188092632 1ml	88158.	7.85	279242.	11.31	145225. :	16.70
0.7	3188092633 1ml	84629	7.84	239892	11 32	131738 !	15 70
0.	1188092681 AC	95588.	7.84	316989.	11.31	172491.	15.71
05	5188092724 AC	102064.	7.83	332892.	11.32	172141. 1	16.70
	188092456 BN						
07	7188092772 BN	89747.	7.86	309192.	11.341	159692.	16.73
98	188092558 AC	. 85604.	7.83	279254.	11.32	147350.	16.70
	31BLK 88092513						
	188092551 BN						
1.7	188092623 AC 188081971 REX	1 9/809. 1	7.83				
						143584.	
			' '		·		
		' 	 		''	<u> </u>	·
16						'	
					'		
18		·	' '	' 		······································	
19		· · · · · · · · · · · · · · · · · · ·			<u> </u>		
22							
			-				

page 1 of 1

できる かんしょうかい アンダング・・・・・

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d8

UPPER LIMIT = + 100%

LOWER LIMIT = - 50%

of internal stansard area.

of internal standard area.

[#] Column used to flag internal standard area välues with an asterisk

Lab Name: Engineering Science	Contract:
Lab Code: ESØ1 Case No.:	SAS No.: SDG No.:
Lab File ID (Standard): >E6313	Date Analyzed:11/23/88
Instrument ID: 70 2	Time Analyzed: 9:57

			•			
1	IS4(PHN)	ſ	ISS(CRY)		IS3(PRY)	
•	AREA #	RT	AREA #	RT	AREA #1	RT ;
	•	•	•			•
1 12 HOUR STD						
	•	•	•	•	•	
UPPER LIMIT			245104,		140098.	
	•	•	•		•	
! LOWER LIMIT			61276.		35024.	
I EPA SAMPLE	•	!	!	!	!	!!
1 NO.	₹ !	!	•	! !	1	
				AEE===		=====
01188092881 AC	278291.	21.32	1 126724.	29.68	54861.	34.531
02:88092632 1ml	1 211234.	21.30	95662.	29.66	46974.	34.531
03:88092633 1ml	208253.	21.31	96413.	29.68	27889.	34.54
04188092681 AC						
05188032724 AC						
06188092456 BN						
07186092772 BN						
08188092558 AC						
09:BLK 88092513						
10:88092551 BN 11:88092623 AC		1 21.29			-	
12188081971 REX						
131					. 47.03. I	
141						
151						
16:				l	l	
171	1	1	1	l	l	l
181	1	·		·	l	
191				!		
201		<u> </u>		!	!	
211		<u> </u>		!	!	
221	i	·				

```
IS4 (PHN) = Phenanthrene-d10
```

ISS (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal stansard area.

LOWER LIMIT = - 50%

of internal standard area.

Column used to flag internal standard area values with an asterisk

page 1 of 1

FORM VIII SV-2

1/87 Rev.

ATILE CONTINUINS CALIBRATION CHECK Contract:____ bName:_ D Code: _____ Case No.:____ SAS No.:_ s:rument ID:carbopak_____ Calibration Date(s):_8/31/89 TAB FILE ID: _74____ Init. Calib. Date(s):8/30/89, 8/15/89 RRE OMPOUND RRF50 %D nzyl chloride_____ 0.08 100.00 is (2-charae/hary) rthane____ 0.04100.00 🕯-s (2-choroteopropy 0.26 100.00 romobenrous____ 1.28 1.21 -5.89 emodichloremethere 2.99 J.26 -8.56 l'omofere 0.79 -69.36 1.33 0.230.72 2.96 romomethers____ f rbon telrachity de_____ 0.98 2.58 13.33 ' ERR lorosco eldehyde____ ERR hlorobenzone 11.30 1.39 1.23 plonoeths on 0.40 0.39 2.20 lorefar -____ 3.64 3.52 3.12 Chorence $O \subseteq \Psi \cap$ 0.75 18.75 -Chloroscoyl veny) ether 0.03 100.00 loresether. 0.230.41 -78.18 lonomoney: methyl ether_ 0.17 100.00 3.22 __,m__,& p_CPU or ot oluenes __ 3.99 19.33 | bromocr. uromathave_____ 3.59 3.28 8.47 promomerhany___ 2.98 2.20 26.23 ,2_Dichlorobenzene____ 2.36 1.92 18.56 ,3_Dich)cropenzene____ 1.59 3.38 53.06 | 4_Dich)orobenzene_____ 2.51 22,40 (chiorod:fluormethane____ 0.54 100.00 ,1_Dichlorosthane____ 1.43 1.42 0.97 [2_Dichloroethane_____ 1.69 2.09 -23.461_Dichloroethylene____ 1.26 1.76 -39.37race_1,2_dichloroethylene 1.42 1.19 15.90 /chloromethane _ 4.11 2.96 27.85 7_Dichloropropana____ 1.93 1.96 -1.60 ,3_Dichloropropylene 4.60 3.18 30.90 _i,2,7_TetrasiJorwethane_ 6.89 5.44 21.02 [2,1,2] Tetracolorcethane_ Locality Lene_____ 3.61 2.48 31.35 6.89 5.44 21.07 ,1,1_Trick/or wethane. 1.75 1.51 13.89 Tiga_Trachlem.otmene____ 4,60 3.18 30,90 &chlorostry:ene____ 4.22 3.48 17.41 ichlored: or markane 1.76 1.13 35.71 2323 Carte and the second second 3.59 2.59 25.12

0.45

0.62

-34.97

は、一般のでは、これは、からからでは、これないないできょうないがくしょうことは、これにいるしていると

ATILE CONTINUING CALIBRA	ATION CH	ECK			
Name: ENGINEERING SCIENCE	*** <u> </u>	Contr	act:	·	
Code: Case No.:_	SAS	No.:	SDG No.	*	
rrument ID.:carbopak Cal	ibration D	ate(s):8	/3ф/68		
FILE ID: RRF 5074			Inilalea	lib=	8/30/88
1PÔU!:15	RAF	RRF50	%D		
17 60 6	4.27	4.99			
.orobenzena 	2.24	4.71 2.34	12.30 4.30		
O_Dichlarobenzere	2.73	2.49	-8.42		
* Dichord engers		2.65	-14.15		
'yl Benters		2.53			
vere	3.22	3.73			
.enezrene	2.05	7.17			

DATA PACKAGE #40

This page intentionally left blank.

RESEARCH AND DEVELOPMENT LABORATORY 600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 841-7353

REVISED REPORT

Job No.: OR001

Work Order No.: 877

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

· Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the soil sample(s) received by this laboratory on 8-18-88.

Sample Preparation Data

e							
	Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
and the second	88081943	DANGB3-SS-D5	8270	8-17-88	8-26-88	11-28-88	
ž.	88081944	DANGB3-SS-C5	8270	8-17-88	8-26-88	12-01-88	
	88081945	DANGB3-SS-A4	8270	8-17-88	8-26-88	10-05-88	
	88081946	DANGB3-SS-A5	8270	8-17-88	8-26-88	12-12-88	
	88081947	DANGB3-SS-Z2	8270	8-17-88	8-26-88	10-27-88	
	88081948	DANGB3-SS-Y2	8270	8-17-88	8-26-88	11-28-88	
•	88081949	DANGB3-SS-B2	8270	8-17-88	8-26-88	11-28-88	
	88081950	DANGB3-SS-A2.5	8270	8-17-88	8-26-88	10-05-88	
	88081951	DANGB3-SS-A3.5	8270	8-17-88	8-26-88	11-28-88	
	88081952	DANGB3-SS-D2	8270	8-17-88	8-26-88	11-28-88	
	88081953	DANGB3-SS-D4	8270	8-17-88	8-26-88	11-29-88	
_	88081954	DANGB3-SS-A3	8270	8-16-88	8-26-88	11-29-88	
	88081955	DANGB3-SS-A1	8270	8-16-88	10-28-88	11-01-88	
	88081956	DANGB3-SS-CO	8270	8-16-88	10-28-88	11-02-88	
_	880819:7	DANGB3-SS-C1	8270	8-16-88	8-26-88	11-29-88	
_	88081958	DANGB3-SS-C3	8270	8-16-88	8-26-88	11-29-88	
_	88081959	DANGB3-SS-A2	8270	8-16-88	8-26-88	11-28-88	
	000000	2.1.1023 22 112	02,0	5 15 50	3 2 3 30	XX 20 00	

* If applicable

SOLI S. AMAL WOLLD	OUIRED EN	127	TO STANDED TO STANDED		X X X				, x x				- X X		7 u				(Signature) Date/Time Received by: (Signature)		Remarks
			0000 M 0000 M 0000 M	3	× × × × × × × × × × × × × × × × × × ×		×××××××××××××××××××××××××××××××××××××××		> > ×	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	XXX		×		××××	×	× × × ×		Inquished by:	•	Date/Time Rem
	ŏ	0 00 N	TAINERS		. \						/			_	,		-		ture.)		atory by:
	h, Mn.	Peter Elumenum	IPTION	•				•			23	28		•	•			•	Received by: (Signa		Received for Labora (Signature)
PROJECT NAME/LOCATION	Duluth ANGB/ Duluth, Mn.	SATE S	SAMPLE DESCRIPTION	- 55-44.	DANGES - 55 - A.4.	- 58 - 45 .	DANU83-45-45.	- 55- 22.	-55-22.	DANGB3-55-42.	5-55-42.	-55 -82.	55 - 182.	3-55-A2.5.	DAN613-55-A2,5	- 55- A3.5 .	DANGB3-55- A3.5 .	- 55 - 02.	Date/Time	141 ren-8	Dete/Time
PROJECT NA	Duluth	SAMPLERIS): (Signature)		DANGB3	DANGES	DAN603 -	DANUES	DANGB3-	DANGBI-55-	DANGBS	DAN6B3-	DAN683-55	DANGB3-	DANGB3-	DAN6133	DANG B3 -	DANGB3	DANGB3	Relinquished by: (Signature)	" Se	Relinquished by: (Signature)
JOB NO.	ÓR001	LEBIS): (!	TIME	6119	10017	0935	10937	1 1011	0701 1	8-11-84 1629	1037	1135	1140	8511	1206	1230	1233	ISOG	ulshed by:	1/2	ulaned by:
ES JO	Ö	SAMP	DATE	Ju-11-8	4-11-16	X-11-3K	8-17-34	4-17-14	\$4-61-8	8-11-8	8-11-84	8-11-84	35-11-8	8-11-81	15-61-8	1261.0	13-61-8	K5-c1-8	Rellnqu	12	Rellng

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

The second secon	IP TO: INEERING-SCIENCE	600 Bancroft Way Berkeley, CA. 54710	NEWARKS	encole is for R. O.	20	1									Date/Time Received by: (Signature)		•
OF US, US, USY INTEGRALISMENT PROPERTY OF CONTRACTOR OF CO	SOILS ANALYSES		TAINERS (00)00/10 10 10 10 10 10 10 10 10 10 10 10 10 1	X X X		XXXXXX									ture) Relinquished by: (Signature)	1	Total Senacks
ALIAHO	PROJECT HAME/LOCATION Duluth ANGB/Duluth, Mn.	Jonatura) Peter E Rimmann	SAMPLE DESCRIPTION	DANG83-55-02 .	DANGB3-55-04.	DANCB 3-55 - DA.			(5)		9)/ 			87775 1745 Received by: (Signa	Date/Time Beceived for Labore	(Signature)
र् जन्म स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्थापना स्	CS JOB NO.	SAMPLER(S): (Signature)	DATE TIME	1151 84-21-8		8-173r 1545		1	2;	329	9			Selipour Parket	Met 12.	Relinquished by: (Signature)	

Distribution: Original Accompanies Shipment, Copy to Coordinator Field Files

9493306766	Departs Phone Number (Nert Importer)	Sam A II Propried	EDET Address Nove	State IIP Required	ECLARED VALUE Federal Express Use			den appr. Votr rights in wooden word. Other 2 Other 2 Other 3 Other 3 Other 3 Other 3 Other 3 Other 4 Other 5 Other 5 Other 5 Other 5 Other 6 Other 6 Other 7		
SENDER'S COPY	Collinaries Please Print		IF NOLD FOR PICK-UP, Print FEDEX Address Nors	A10	SERVICE CONDITIONS, DECLARED VALUE	Use of this and constitutes your appreciant to the service conditions in our current Service Guide which is available upon request. See body of seasons copy of this applict to harve information.	pocación white the result of total compa, other or rou- unitar you spoch a hope a mouran in a spece to the let, pre actionnes 100 specied and occument you actual for evera of a chem Maumum amount invisions found or the	0.510	be the left of the control of the co	Sender authorizes Federa ment without obtaining a indemnity and hold harmin claims resulting the from Release Signalure:
AIRBILL on shipments to printed in the company of t	Your Phone Number (New Important) (1) 15 48 1-470 Department/Floor No.		WILL APPEAR ON INVOICE)	in in in it is the contract of	ANDLING PACEASES STOCKT PROFILE SALAND	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)			1C Regular Stop 1C Regular Stop 3C ACAI Stop Drop Stor BSC	FEDEX Corp. Employee No Date/Time for FEDEX Use
AIRBILL THE STANDARD OF SOMESTIC SINGLES WITHIN THE CONTINUES THE STANDARD OF STANDARD O	1/7		TOUR BILLING REFERENCE INFORMATION (FIRST 24 CHARACTERS WILL AFFEAR ON INVOICE)	COMMITS FACEL ACCT NO. DA DIO PAY FACE! ACCT NO.	DELIVERY AND SPECIAL HANDLING	IGHT 1 1 HOLD FOR PICK-UP PARTIES	3 DELIVER SATURDAY Emonge	5 CONSTINUENT SURFILLANCE STATICE (CSS)	ם'ם נ	9 STREAM PICE BY 10 O O 11 O O 12 O DELEGENT REPORTER OF THE PICE
Sender a Fooral Express Account North	From (Your Name) Please Print)	Servinduess	TOUR BILLING REFERENCE INFO	MYMENT	SERVICES	1 Canoniti 6 OVERNIENT	2 COUNCE-PAR 7 COUNCE-PAR 7 COUNCES	3- OVERWENT 8	4 C TURE	S STANDARY 10
		A	d03	.w. D S	Į.	IO	~ .	क 1 ने म	>n1.	76.4

REVISED

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
EPA 8270 ANALYSIS
WORK ORDER NO.: 877

The extraction date for sample 88081955 and 88081956 was originally reported as 8-26-88. Due to surrogate spike recoveries that were out of EPA QC limits, these samples were re-extracted on 10-28-88. Surrogate spike recoveries in the second extraction met EPA criteria. The later extraction date should be used.

te Received: August 18, 1988 te Reported: December 7, 1988 Work Order: 877 Job Number: OR001

ATTN: Mr. Bill Hayden

ES:Oak Ridge/Duluth ANGB

ess: 710 S. Illinois Ave, Suite F-103

> Number:	88081943	88081944
aple No.:	DANGB3-SS-D5	DANGB3-SS-C5
te Sampled:	08-17-88	08-17-88
ne Sampled:	16:04	16:25
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	12-01-88
rcent Moisture:	17	29

npound	Detection Limits	ANALYTICA (dry w		·
	ug/kg	ug/kg	ug/kg	
3-Dichlorobenzene	330	ND	ND	
4-Dichlorobenzene	330	ND	ND	
xachloroethane	330	ND	ND	
s(2-chloroethyl)ether	330	ND	ND	
2-Dichlorobenzene	330	ND	ND	
Nitrosodimethylamine	330	ND	ND	
s(2-chloroisopropyl)ethe	er 330	ND	ND	
Nitrosodi-n-propylamine	330	ND	ND	
xachlorobutadiene	330	ND	ND	
2,4-Trichlorobenzene	330	ND	ND	
trobenzene	330	ND	ND	
ophorone	330	ND	ND	
phthalene	330	ND	ND	
<pre>5(2-chloroethoxy)methane</pre>	330	ND	ND	
Thloronaphthalene	330	ND	ND	
xachlorocyclopentadiene	330	ND	ND	
enaphthylene	330	ND	ND	
enaphthene :	330	ND	ND	
methyl phthalate	330	ND	ND	
5-Dinitrotoluene	330	ND	ND	
lorene .	330	ND	ND	
i-Dinitrotoluene	330	ND	ND	
ethyl phthalate	330	ND	ND	
Nitrosodiphenylamine	330	ND	ND	
xachlorobenzene	330	ND	ND	

⁼ Compound was detected in the blank.

Pate Received: August 18, 1988 te Reported: December 7, 1988 Work Order: 877 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

ab Number:	88081943	88081944
mple No.:	DANGB3-SS-D5	DANGB3-SS-C5
Jate Sampled:	08-17-88	08-17-88
Time Sampled:	16:04	16:25
te Extracted: te Analyzed:	08-26-88	08-26-88
	11-28-88	12-01-88
Percent Moisture:	17	29

mpound D	etection Limits	ANALYTICA: (dry we	
Ŧ.	ug/kg	ug/kg	ug/kg
ienanthrene	330	ND	ND
Anthracene	330	ND	ND
butyl phthalate .uoranthene	330	ND	ND
uoranthene	330	ND	ND
4-Chlorophenyl phenyl ether	330	ND	ND
₹urene	330	ND	ND
itvl Benzvl phthalate	330	ND	480
518(2-ethylhexyl) phthalate	330	ND	ND
Chrysene	330	ND	ND
4 Bromophenyl phenyl ether	330	ND	ND
∄:nzo(a)anthracene	330	ND	ND
Di-n-octylphthalate	330	ND	ND
∄nzo(b)fluoranthene	330	ND	ND
i nzo(k)fluoranthene	330	ND	ND
Benzidine	2000	ND	ND
3.3'-Dichlorobenzidine	660	ND	ND
inzo(a)pyrene	330	ND	ND
<pre>findeno(1,2,3-cd)pyrene</pre>	330	ND	ND
Dibenzo(a,h)anthracene	330	ND	ND
inzo(ghi)perylene	330	ND	ND
#mzyl Alcohol	660	ND	ND

Compound was detected in the blank.

te Received: August 18, 1988 Work Order: 877
te Reported: December 7, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

iress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081943	88081944
nple No.:	DANGB3-SS-D5	DANGB3-SS-C5
ce Sampled:	08-17-88	08-17-88
ne Sampled:	16:04	16:25
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	12-01-88
ccent Moisture:	17	29

npound	. Detection Limits		al Results Weight)
	ug/kg 	ug/kg	ug/kg
∍tophenone	*	ND	ND
iline	*	ND	ND
\minobiphenyl	*	ND	ND
Chloroaniline	660	ND	ND
Chioronaphthalene	×	ND	ND
penzofuran	330	ND	ND
)imethylaminoazobenzen		ND	ND
12-Dimethylbenz(a)anth	racene*	ND	ND
,a-Dimethylphenethylam	ine∗	ND	ND
phenylamine	*	ND	ND
2-Diphenylhydrazine	*	ND	ND
yl methanesulfonate	*	ND	ND
dethylcholanthrene	 *	ND	ND .
thyl methanesulfonate	*	ND	ND
4ethylnaphthalene	330	ND	ND
;aphthylamine	x	ND	ND
√aphthylamine	*	ND	ND
Jitroaniline	1600	ND	ND
itroaniline	1600	ND	ND
Vitroaniline	1600	ND	ND
Vitroso-di-n-butylamin	e*	ND	ND
;itrosopiperidine	*	ND	ND
itachlorobenzene	*	ND	ND
ntachloronitrobenzene	*	ND	ND
enacetin	*	ND	ND
Picoline	~~*	ND	ND
namide	*	ND	ND
3,4,5-Tetrachlorobenze	ne∗	ND	ND

Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Tate Received: August 18, 1988 Work Order: 877

Qate Reported: December 7, 1988 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

The Address of the Commercial Com

Marcent Moisture: 17 29	Lab Number: Ample No.: Ite Sampled: Time Sampled: Date Extracted: Ate Analyzed:	88081943 DANGB3-SS-D5 08-17-88 16:04 08-26-88 11-28-88	88081944 DANGB3-SS-C5 08-17-88 16:25 08-26-88 12-01-88
	Mercent Moisture:	17	29

mpound	Detection Limits		rICAL RESULTS ry weight)
70日 日 日	ug/kg	ug/kg	ug/kg
Lpha-BHC	*	ND	ND
Jamma-BHC	 *	ND	ND
Beta-BHC	660	ND	ND
*ptachlor	330	ND	ND
€1ta-BHC	500	ND	ND
Aldrin	330	ND	ND
#eptachlor epoxide	330	ND	ND
idosulfan I	*	ND	ND
Dieldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
idrin	*	ND	ND
a.idosulfan II	*	ND	ND
4,4'-DDD	500	ND	ND
₹ 4'-DDT	830	ND	ND
dosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
Endrin Ketone	*	ND	ND
lordane	2000	ND	ND
Tethoxychlor	*	ND	ND
Toxaphene	2000	ND	ND
Foclor-1016	2000	ND	ND
Foctor-1221	2000	ND	ND
Aroclor-1232	2000	ND	ND
声 oclor - 1242	2000	ND	ND
coclor-1248	2000	ND	ND
Āroclor-1254	2000	ND	ND
aroclor-1260	2000	ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

te Received: August 18, 1988 te Reported: December 7, 1988 Work Order: 877 Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

ress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Number:	88081943	88081944
nple No.:	DANGB3-SS-D5	DANGB3-SS-C5
te Sampled:	08-17-88	08-17-88
ne Sampled:	16:04	16:25
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	12-01-88
rcent Moisture:	17	29

npound	Detection ANALYTICAL RESULTS Limits (dry weight)			
	ug/kg	ug/kg	ug/kg	
Chlorophenol	330	ND	ND	
Vitrophenol	330	ND	ND	
enol	330	ND	ND	
1-Dimethylphenol	330	ND	ND	
1-Dichlorophenol	330	ND	ND	
1,6-Trichlorophenol	330	ND	ND	
Chloro-3-methylphenol	660	ND	ND	
4-Dinitrophenol	1600	ND	ND	
5-Dichlorophenol	*	ND	ND	
4ethyl-4,6-Dinitrophenol	1600	ND	ND	
ntachlorophenol	1600	ND	ND	
\1trophenol	1600	ND	ND	
izoic Acid	1600	ND	ND	
4ethylphenol	330	ND	ND	
& 4-Methylphenol	330	ND	ND	
3,4,6-Tetrachlorophenol	x	ND	ND	
1,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

- = Compound was detected in the blank.
- CE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ATTN: Mr. Bill Hayden

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

ate Received: August 18, 1988 Work Order: 877
December 7, 1988 Job Number: OR001

₽R:

ES:Oak Ridge/Duluth ANGB

ddress: 710 S. Illinois Ave, Suite F-103

lab Number:	88081945	88081946
<pre>¿ample No.:</pre>	DANGB3-SS-A4	DANGB3-SS-A5
ite Sampled:	08-17-88	08-17-88
ine Sampled:	09:17	09:37
Date Extracted:	08-26-88	08-26-88
ite Analyzed:	10-05-88	12-12-88
ercent Moisture:	11	56

rompound	Detection Limits		L RESULTS eight)
3	ug/kg	ug/kg `	ug/kg
3 - Dichlorobenzene	330	ND	ND
, 4-Dichlorobenzene	330	ND	ND
dexachloroethane	330	ND	ND
s(2-chloroethyl)ether	330	ND	ND
, 2-Dichlorobenzene	330	ND	ND
N-Nitrosodimethylamine	330	ND	ND
Pis(2-chloroisopropyl)ethe	r 330	ND	ND
-Nitrosodi-n-propylamine	330	ND	ND
iexachlorobutadiene	330	ND	ND
1,2,4-Trichlorobenzene	330	ND	ND
trobenzene	330	ND	ND
isophorone	330	ND	ND
Naphthalene	330	ND	ND
[.s(2-chloroethoxy)methane	330	ND	ND
-Chloronaphthalene	330	ND	ND
dexachlorocyclopentadiene	330	ND	ND
}cenaphthylene	330	ND	ND
]:enaphthene	330	ND	ND
∮amethyl phthalate	330	ND	ND
2,6-Dinitrotoluene	330	ND	ND
luorene	330	ND	ND
.4-Dinitrotoluene	330	ND	ND
Diethyl phthalate	330	ND	ND
-Nitrosodiphenylamine	330	ND	ND
xachlorobenzene	330	ND	ND

⁼ Compound was detected in the blank.

dress: 710 S. Illinois Ave, Suite F-103

> Number:	88081945	88081946
aple No.:	DANGB3-SS-A4	DANGB3-SS-A5
te Sampled:	08-17-88	08-17-88
ne Sampled:	09:17	09:37
te Extracted:	08-26-88	08-26-88
:e Analyzed:	10-05-88	12-12-88
cent Moisture:	11	56

npound D	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
nanthrene	330	ND	ND	
thracene	330	ND	ND	
outyl phthalate	330	ND	ND	
loranthene	330	ND	ND	
Chlorophenyl phenyl eth	er 330	ND	ND	
rene	330	ND	ND	
tyl Benzyl phthalate	330	ND	ND	
5(2-ethylhexyl) phthala	te 330	ND	ND	
rysene	330	ND	N D	
3romophenyl phenyl ethe	r 330	ND	ND	
nzo(a)anthracene	330	ND	ND	
-n-octylphthalate	330	ND	ND	
120(b)fluoranthene	330	ND	ND	
120(k)fluoranthene	330	ND	ND	
nzidine	2000	ND	ND	
3'-Dichlorobenzidine	660	ND	ND	
ızo(a)pyrene	330	ND	ND	
<pre>ieno(1,2,3-cd)pyrene</pre>	330	ND	ND	
⊃enzo(a,h)anthracene	330	ND	ND	
nzo(ghi)perylene	330	ND	ND	
nzyl Alcohol	660	ND	ND	

⁼ Compound was detected in the blank.

(continued)

Work Order: 877 Date Received: August 18, 1988 ate Reported: December 7, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

The state of the s		
Lab Number:	88081945	88081946
imple No.:	DANGB3-SS-A4	DANGB3-SS-A5
ite Sampled: Time Sampled:	08-17-88	08-17-88
Time Sampled:	09:17	09:37
Pate Extracted:	08-26-88	08-26-88
Pate Extracted: Pate Analyzed: Percent Moisture:	10-05-88	12-12-88
Percent Moisture:	11	56

	Detection Limits	_	al Results weight)
	ug/kg	ug/kg	ug/kg
cetophenone	*	ND	ND
Āniline	*	ND	ND
1-Aminobiphenyl	*	ND	ND
-Chloroaniline	660	ND	ND
-Chloronaphthalene	*	ND	ND
Dibenzofuran	330	ND	ND
-Dimethylaminoazobenzene	*	ND	ND
,12-Dimethylbenz(a)anthra	cene*	ND	ND
a-,a-Dimethylphenethylamin	ıe∗	ND	ND
piphenylamine	*	ND	ND
,2-Diphenylhydrazine	*	ND	ND
Ethyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	*	ND .	ND
∰ >thyl methanesulfonate	*	ND	ND
L-Methylnaphthalene	330	ND	ND
1-Naphthylamine	 ★	ND	ND
f-Naphthylamine	*	ND	ND
-Nitroaniline	1600	ND	ND
3-Nitroaniline	1600	ND	ND
^-Nitroaniline	1600	ND	ND
-Nitroso-di-n-butylamine	*	ND	ND
√-Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	*	ND	ND
ntachloronitrobenzene	 ★	ND	ND
{ nenacetin	*	ND	ND
2-Picoline	*	ND	ND
fronarij de	*	ND	ND
,2,4,5-Tetrachlorobenzene	¥	ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

ce Received: August 18, 1988 Work Order: 877 ce Reported: December 7, 1988 Job Number: OR001

RES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

o Number:	88081945	88081946
nple No.:	DANGB3-SS-A4	DANGB3-SS-A5
ce Sampled:	08-17-88	08-17-88
ne Sampled:	09:17	09:37
te Extracted:	08-26-88	08-26-88
te Analyzed:	10-05-88	12-12-88
rcent Moisture:	11	56

npound	Detection Limits		ICAL RESULTS y weight)
	ug/kg	ug/kg	ug/kg
pha-BHC		ND	ND
nma-BHC	*	ND	ND
ta-BHC	660	ND	ND
ptachlor	330	ND	ND
lta-BHC	500	ND	ND
drin	330	ND	ND
ptachlor epoxide	330	ND	ND
iosulfan I	··· - *	ND	ND
eldrin	500	ND	ND
4'-DDE	1000	ND	ND
drin	*	ND	ND
dosulfan II	*	ND	ND
4'-DDD	500	ND	ND
4'-DDT	830	ND	ND
dosulfan Sulfate	1000	ND	ND
drin aldehyde	*	ND	ND
drin Ketone	·	ND	ND
lordane	2000	ND	ND
choxychlor	*	ND	ND
xaphene	2000	ND	ND
oclor-1016	2000	ND	ND
oclor-1221	2000	ND	ND
oclor-1232	2000	ND	ND
oclor-1242	2000	ND	ND
oclor-1248	2000	ND	ND
oclor-1254	2000	ND	ND
oclor-1260	2000	ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Date Received: August 18, 1988 Date Reported: December 7, 1988 DR: ES:Oak Ridge/Duluth ANGB

Work Order: 877 Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081945	88081946
ample No.:	DANGB3-SS-A4	DANGB3-SS-A5
Date Sampled:	08-17-88	08-17-88
Time Sampled:	09:17	09:37
ate Extracted:	08-26-88	08-26-88
ate Analyzed:	10-05-88	12-12-88
Percent Moisture:	11	56

**				
pnuogmc	Detection Limits		L RESULTS eight)	
· ecus	ug/kg	ug/kg	ug/kg	
Z-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
nenol	330	ND	ND	
4-,4-Dimethylphenol	330	ND	ND	
2,4-Dichlorophenol	330	ND	ND	
7,4,6-Trichlorophenol	330	ND	ND	
-Chloro-3-methylphenol	660	ND	ND	
2,4-Dinitrophenol	1600	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
-Methyl-4,6-Dinitrophenol	1600	ND	ND	
entachlorophenol	1600	ND	ND	
{-Nitrophenol	1600	ND	ND	
enzoic Acid	1600	ND	ND	
-Methylphenol	330	ND	ND	
3~ & 4-Methylphenol	330	ND	ND	
<pre>3,4,6-Tetrachlorophenol</pre>	*	ND	ND	
,4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

3 = Compound was detected in the blank.

DTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGÎNEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

te Réceived: August 18, 1988 ce Reported: Décember 7, 1988

ist if it is in the second

Work Order: 877 Job Number: Okoo1

ATTN: Mr. Bill Hayden

∹ :

ES:Oak Ridge/Duluth ANGB

iress: 710 S. Illinois Ave, Suite F-103

o Number:	· 88081947	88081948
nple No.:	DANGB3-SS-Z2	DANGB3-SS-Y2
te Sampled:	08-17-88	08-17-88
ne Sampled:	10:20	10:37
te Extracted:	08-26-88	08-26-88
te Analyzed:	10-27-88	11-28-88
rcent Moisture:	13	21

npound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
3-Dichlorobenzene	330	ND	ND	
4-Dichlorobenzene	330	ND	ND	
xachloroethane	330	ND	ND	
s(2-chloroethyl)ether	330	ND	ND	
2-Dichlorobenzene	330	ND	ND	
Nitrosodimethylamine	330	ND	ND	
s(2-chloroisopropyl)eth		ND	ND	
Nitrosodi-n-propylamine	330	ND	ND	
xachlorobutadiene	330	ND	ND	
2,4-Trichlorobenzene	330	ND	ND .	
trobenzene	330	ND	ND	
ophorone	330	ND	ND	
phthalene	330	ND	ND	
s(2-chloroethoxy)methan	e 330	ND	ND	
Chloronaphthalene	330	ND	ND	
kachlorocyclopentadiene	330	ND	ND	
enaphthylene	330	ND	ND	
enaphthene	330	ND	ND	
nethyl phthalate	330	ND	ND	
5-Dinitrotoluene	330	ND	ND	
lorene	330	ND	ND	
4-Dinitrotoluene	330	ND	ND	
ethyl phthalate	330	ND	ND	
Nitrosodiphenylamine	330	ND	ND	
xachlorobenzene	330	ND	ND	

⁻ Compound was detected in the blank.

Date Received: August 18, 1988 Work Order: 877 Tite Reported: December 7, 1988
FOR: ES:Oak Ridge/Duluth ANGB Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830

Lab Number:	88081947	88081948
imple No.: Lite Sampled:	DANGB3-SS-Z2	DANGB3-SS-Y2
Lite Sampled:	08-17-88	08-17-88
Fime Sampled:	10:20	10:37
inte Extracted:	08-26-88	08-26-88
ite Analyzed:	10-27-88	11-28-88
Percent Moisture:	13	21

mpound .	Detection Limits	ANALYTICAI (dry we	
	ug/kg	ug/kg	ug/kg
£'			
lenanthrene	330	ND	ND
Anthracene	330	ND	ND
्रे ^j butyl phthalate	330	ND	ND
₫.uoranthene	330	ND	ND
#-Chlorophenyl phenyl ether	r 330	ND	ND
Pyrene	330	ND	ND
įtyl Benzyl phthalate	330	ND	ND
1.s(2-ethylhexyl) phthalate	e 330	ND	ND
Chrysene	330	ND	ND
& Bromophenyl phenyl ether	330	ND	ND
∮enzo(a)anthracene	330	ND	ND
<pre>ji-n-octylphthalate</pre>	330	ND	ND
ੜ੍ਹenzo(b)fluoranthene	330	ND	ND
nzo(k)fluoranthene	330	ND	ND
5enzidine	2000	ND	ND
3,3'-Dichlorobenzidine	660	ND	ND
∮:nzo(a)pyrene	330	ND	ND
deno(1,2,3-cd)pyrene	330	ND	ND
Dibenzo(a,h)anthracene	330	ND	ND
nzo(ghi)perylene	330	ND	ND
anzyl Alcohol	660	ND	ND

⁼ Compound was detected in the blank.

te Received: August 18, 1988 Work Order: 877 te Reported: December 7, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

iress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081947	88081948
aple No.:	DANGB3-SS-Z2	DANGB3-SS-Y2
te Sampled:	08-17-88	08-17-88
ne Sampled:	10:20	10:37
te Extracted:	08-26-88	08-26-88
te Analyzed:	10-27-88	11-28-88
rcent Moisture:	13	21

npound	Detection Limits	-	al Results Weight)
	ug/kg	ug/kg	ug/kg
etophenone	*	ND	ND
ıline	*	ND	ND
Aminobiphenyl	*	ND	ND
Chloroaniline	660	ND	ND
Chloronaphthalene	*	ND	ND
penzofuran	330	ND	ND
Dimethylaminoazobenzene	* *	ND	ND
12-Dimethylbenz(a)anthra	acene*	ND	ND
,a-Dimethylphenethylamin		ND	ND
phenylamine	*	ND	ND
2-Diphenylhydrazine	*	ND	ND
ayl methanesulfonate	*	ND	ND
1ethylcholanthrene	*	ND	ND
thyl methanesulfonate	·*	ND	ND
4ethylnaphthalene	330	ND	ND
Vaphthylamine	*	ND	ND
Vaphthylamine	*	ND	ND
√itroaniline	1600	ND	ND
Vitroaniline	1600	ND	ND
<pre>Vitroaniline</pre>	1600	ND	ND
Vitroso-di-n-butylamine	*	ND	ND
Nitrosopiperidine	*	ND	ND
ntachlorobenzene	*	ND	ND
atachloronitrobenzene	*	ND	ND
>nacetin	 ★	ND	ND
Picoline	*	ND	ND
onamide	*	ND	ND
2,4,5-Tetrachlorobenzene	∋×	ND	ND

^{*} Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Tate Received: August 18, 1988 Work Order: 877
Date Reported: December 7, 1988 Job Number: OR001

DR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

ab Number:	88081947	88081948	
Sample No.:	DANGB3-SS-Z2	DANGB3-SS-Y2	
Tate Sampled:	08-17-88	08-17-88	
lime Sampled:	10:20	10:37	
Date Extracted:	08-26-88	08-26-88	
arte Analyzed:	10-27-88	11-28-88	
ate Analyzed: ercent Moisture:	13	21	

Compound	Detection Limits		'ICAL RESULTS ry weight)
Apple of the second of the sec	ug/kg	ug/kg	ug/kg
¶lpha-BHC	*	ND	ND
amma-BHC	*	ND	ND
Beta-BHC	660	ND	ND
deptachlor €	330	ND	ND
∍lta-BHC	500	ND	ND
Aldrin	330	ND	ND
deptachlor epoxide	330	ND	ND
andosulfan I	 ★	ND	ND
ieldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
Indrin	*	ND	ND
idosulfan II	*	ND	ND
4,4'-DDD	500	ND	ND
≙-, 4 ' -DDT	830	ND	ND
adosulfan Sulfate	1000	ND	ND
Indrin aldehyde	*	ND	ND
Endrin Ketone	-~*	ND	ND
lordane	2000	ND	ND
! ethoxychlor	*	ND	ND
Toxaphene	2000	ND	ND
₹roclor-1016	2000	ND	ND
:oclor-1221	2000	ND	ND
Āroclor-1232	2000	ND	ND
∆roclor-1242	2000	ND	ND
coclor~1248	2000	ND	ND
Froclor-1254	2000	ND	ND
Aroclor-1260	2000	ND	ND
Section 2			

EPA has not yet determined detection limits for these compounds.

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

te Received: August 18, 1988 Work Order: 877
te Reported: December 7, 1988 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

iress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081947	88081948
nple No.:	DANGB3-SS-Z2	DANGB3-SS-Y2
te Sampled:	08-17-88	08-17-88
ne Sampled:	10:20	10:37
te Extracted:	08-26-88	08-26-88
te Analyzed:	10-27-88	11-28-88
ccent Moisture:	13	21

npound	Detection Limits	ANALYTICAL RESULTS (dry weight)			
	ug/kg	ug/kg	ug/kg		
Chlorophenol	330	ND	ND		
Vitrophenol	330	ND	ND		
enol	330	ND	ND		
1-Dimethylphenol	330	ND	ND		
1-Dichlorophenol	330	ND	ND		
1,6-Trichlorophenol	330	ND	ND		
Chloro-3-methylphenol	660	ND	ND		
4-Dinitrophenol	1600	ND	ND		
5-Dichlorophenol	*	ND	ND		
1ethyl-4,6-Dinitrophenol	1600	ND	ND		
ntachlorophenol	1600	ND	ND		
Nitrophenol	1600	ND	ND		
nzoic Acid	1600	ND	ND		
1ethylphenol	330	ND	ND		
& 4-Methylphenol	330	ND	ND		
3,4,6-Tetrachlorophenol	*	ND	ND		
i,5-Trichlorophenol	330	ND	ND		

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

⁼ Compound was detected in the blank.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Work Order: 877 Tite Received: August 18, 1988
Lite Reported: December 7, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden

DR: ES:Oak Ridge/Duluth ANGB idress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

9			
ab Number:	88081949	88081950	
Sample No.:	DANGB3-SS-B2	DANGB3-SS-A2.5	
	08-17-88	08-17-88	
Tite Sampled: Sampled:	11:40	12:06	
Date Extracted:	08-26-88	08-26-88	
	11-28-88	10-05-88	
ate Analyzed: ercent Moisture:	25	14	

Compound	Detection Limits		L RESULTS eight)	
গেন্ডাল কৰা	ug/kg	ug/kg	ug/kg	
ĝ,3-Dichlorobenzene	330	ND	ND	
4-Dichlorobenzene	330	ND	ND	
Hexachloroethane	330	ND	ND	
≩is(2-chloroethyl)ether	330	ND	ND	
,2-Dichlorobenzene	330	ND	ND	
\[-Nitrosodimethylamine	330	ND	ND	
Bis(2-chloroisopropyl)ethe	er 330	ND	ND	
-Nitrosodi-n-propylamine	330	ND	ND	
exachlorobutadiene	330	ND	ND	
1,2,4-Trichlorobenzene	330	ND	ND	
itrobenzene	330	ND	ND	
sophorone sophorone	330	ND	ND	
laphthalene	330	ND	ND	
<pre>Bis(2-chloroethoxy)methane</pre>	e 330	ND	ND	
-Chloronaphthalene	330	ND	ND	
*!exachlorocyclopentadiene	330	ND	ND	
Acenaphthylene	330	ND	ND	
*tenaphthene	330	ND	ND	
imethyl phthalate	330	ND	ND	
2,6-Dinitrotoluene	330	ND	ND	
Fluorene	330	ND	ND	
🖟,4-Dinitrotoluene	330	ND	ND	
biethyl phthalate	330	ND	ND	
N-Nitrosodiphenylamine	330	ND	ND	
a exachlorobenzene	330	ND	ND	

⁼ Compound was detected in the blank.

te Received: August 18, 1988 Work Order: 877 te Reported: December 7, 1988 Job Number: OR001

lress: 710 S. Illinois Ave, Suite F-103

o Number:	88081949	88081950
aple No.:	DANGB3-SS-B2	DANGB3-SS-A2.5
te Sampled:	08-17-88	08-17-88
ne Sampled:	11:40	12:06
te Extracted:	08-26-88	08-26-88
ce Analyzed:	11-28-88	10-05-88
rcent Moisture:	25	14

npound	Detection Limits	ANALYTICA (dry w	
	ug/kg	ug/kg	ug/kg
enanthrene	330	ND	ND
thracene	330	ND	ND
outyl phthalate	330	ND	ND
loranthene	330	ND	ND
Chlorophenyl phenyl ethe	er 330	ND	ND
rene	330	ND	ND
tyl Benzyl phthalate	330	ND	ND
s(2-ethylhexyl) phthalat	e 330	ND	N D
rysene	330	ND	ND
Bromophenyl phenyl ether	330	ND	ND
nzo(a)anthracene	330	ND	ND
-n-octylphthalate	330	ND	ND .
120(b)fluoranthene	330	ND	ND
nzo(k)fluoranthene	330	ND	ND
nzidine	2000	ND	ND
3'-Dichlorobenzidine	660	ND	ND
nzo(a)pyrene	330	ND	ND
<pre>leno(1,2,3-cd)pyrene</pre>	330	ND	ND
penzo(a,h)anthracene	330	ND	ND
nzo(ghi)perylene	330	ND	ND
azyl Alcohol	660	ND	ND

⁼ Compound was detected in the blank.

Jate Received: August 18, 1988 Work Order: 877
Date Reported: December 7, 1988 Job Number: OR001

r: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

THE STATE OF THE PROPERTY OF THE

蕁 :		
Lab Number:	88081949	88081950
Sample No.:	DANGB3-SS-B2	DANGB3-SS-A2.5
ate Sampled:	08-17-88	08-17-88
me Sampled:	11:40	12:06
Date Extracted:	08-26-88	08-26-88
Tite Analyzed:	11-28-88	10-05-88
ercent Moisture:	2.5	14

Compound !	Detection Limits		al Results veight)
평	ug/kg	ug/kg	ug/kg
:etophenone	~~~*	ND	ND
ailine	*	ND	ND
4-Aminobiphenyl	*	ND	ND
-Chloroaniline	660	ND	ND
-Chloronaphthalene	*	ND	ND
Jibenzofuran	330	ND	ND
p-Dimethylaminoazobenzene	*	ND	ND
12-Dimethylbenz(a)anthra	cene*	ND	ND
4-,a-Dimethylphenethylamin		ND	ND
Diphenylamine	*	ND	ND
1.2-Diphenylhydrazine	*	ND	ND
hyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	*	ND	ND
<pre>fathyl methanesulfonate</pre>	*	ND	ND
-Methylnaphthalene	330	ND	ND
1-Naphthylamine	*	ND	ND
2-Naphthylamine	*	ND	ND
Nitroaniline	1600	ND	ND
Nitroaniline	1600	ND	ND
4-Nitroaniline	1600	ND	ND
[-Nitroso-di-n-butylamine	*	ND	ND
Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	*	ND	ND
Rentachloronitrobenzene	*	ND	ND
enacetin	*	ND	ND
2-Picoline	*	ND	ND
Pronamide	*	ND	N D
1 2,4,5-Tetrachlorobenzene	~~*	ND	ND

^{3. =} Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

te Received: August 18, 1988 Work Order: 877 te Reported: December 7, 1988 Job Number: OR001

3: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

iress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081949	88081950
nple No.:	DANGB3-SS-B2	DANGB3-SS-A2.5
te Sampled:	08-17-88	08-17-88
ne Sampled:	11:40	12:06
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	10-05-88
rcent Moisture:	25	14

npound	Detection Limits		ICAL RESULTS y weight)
	ug/kg	ug/kg	ug/kg
oha-BHC	*	ND	ND
nma-BHC	*	ND	ND
ta-BHC	660	ND	ND
otachlor	330	ND	ND
lta-BHC	500	ND	ND
drin	330	ND	ND
ptachlor epoxide	330	ND	ND
losulfan I	~- ★	ND	ND
eldrin	500	ND	ND
4'-DDE	1000	ND	ND
irin	*	ND	ND
dosulfan II	*	ND	ND
4'-DDD	500	ND	ND
£'-DDT	830	ND	ND
dosulfan Sulfate	1000	ND	ND
drin aldehyde	*	ND	ND
drin Ketone	*	ND	ND
lordane	2000	ND	ND
thoxychlor	*	ND	ND
xaphene	2000	ND	ND
oclor-1016	2000	ND	ND
oclor-1221	2000	ND	ND
oclor-1232	2000	ND	ND
oclor-1242	2000	ND	ND
oclor-1248	2000	ND	ND
oclor-1254	2000	ND	ND
oclor-1260	2000	ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Jate Received: August 18, 1988 Jate Reported: December 7, 1988

Work Order: 877 Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

imple No.:	88081949 DANGB3-SS-B2	88081950 DANGB3-SS-A2.5
Jate Sampled:	08-17-88	08-17-88
Time Sampled:	11:40	12:06
ite Extracted:	08-26-88	08-26-88
ite Analyzed:	11-28-88	10-05-88
Percent Moisture:	25	14

mpound	Detection Limits	(dry w	AL RESULTS reight)
E	ug/kg	ug/kg	ug/kg
-Chlorophenol	330	ND	ND
2-Nitrophenol	330	ND	ND
3'ienol	330	ND	ND
4-Dimethylphenol	330	ND	ND
2,4-Dichlorophenol	330	ND	ND
2.4,6-Trichlorophenol	330	ND	ND
Chloro-3-methylphenol	660	ND	ND
ž;4-Dinitrophenol	1600	ND	ND
2,6-Dichlorophenol	*	ND	ND
√Methyl-4,6-Dinitrophenol	1600	ND	ND
ntachlorophenol	1600	ND	ND
4-Nitrophenol	1600	ND	ND
Panzoic Acid	1600	ND	ND
.Methylphenol	330	ND	ND
5- & 4-Methylphenol	330	ND	ND
2.3,4,6-Tetrachlorophenol	*	ND	ND
4,5-Trichlorophenol	330	ND	ND

Analyst /

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

te Received: August 18, 1988 Work Order: 877 Job Number: OR001 te Reported: December 7, 1988

ATTN: Mr. Bill Hayden ES:Oak Ridge/Duluth ANGB

710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830 iress:

> Number:	88081951	88081952
aple No.:	DANGB3-SS-A3.5	DANGB3-SS-D2
te Sampled:	08-17-88	08-17-88
ne Sampled:	12:33	15:11
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	11-28-88
rcent Moisture:	14	6

npound			L RESULTS eight)
	ug/kg	ug/kg	ug/kg
3-Dichlorobenzene	330	ND	ND
1-Dichlorobenzene	330	ND	ND
kachloroethane	330	ND	ND
3(2-chloroethyl)ether	330	ND	ND
2-Dichlorobenzene	330	ND	ND
Nitrosodimethylamine	330	ND	ND
s(2-chloroisopropyl)ethe	r 330	ND	ND
Nitrosodi-n-propylamine	330	ND	ND
<achlorobutadiene< td=""><td>330</td><td>ND</td><td>ND</td></achlorobutadiene<>	330	ND	ND
2,4-Trichlorobenzene	330	ND	ND
trobenzene	330	ND	ND
ophorone	330	ND	ND
phthalene	330	ND	ND
3(2-chloroethoxy)methane	330	ND	ND
Chloronaphthalene	330	ND	ND
<pre><achlorocyclopentadiene< pre=""></achlorocyclopentadiene<></pre>	330	ND	ND
enaphthylene	330	ND	ND
∍naphthene	330	ND	ND
nethyl phthalate	330	ND	ND
5-Dinitrotoluene	330	ND	ND
lorene	330	ND	ND
4-Dinitrotoluene	330	ND	ND
ethyl phthalate	330	ND	ND
Vitrosodiphenylamine	330	ND	ND
Aachlorobenzene	330	ND	ND

⁼ Compound was detected in the blank.

Jate Received: August 18, 1988 Tate Reported: December 7, 1988

Work Order: 877 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANG 3

ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: 88081951 88081952 DANGB3-SS-A3.5 DANGB3-SS-D2 ample No.: 08-17-88 08-17-88 Fime Sampled: 12:33 15:11 ate Extracted: 08-26-88 08-26-88 ate Analyzed: 11-28-88 11-28-88 Percent Moisture:

Dompound	etection Limits	ANALYTICA (dry w	
5	ug/kg	ug/kg	ug/kg
nenanthrene	330	ND	ND
Anthracene	330	ND	ND
ibutyl phthalate	330	ND	ND
<pre> luoranthene </pre>	330	ND	ND
4-Chlorophenyl phenyl ether	330	ND	ND
pvrene	330	ND	ND
ityl Benzyl phthalate	330	ND	ND
ئاء:(2-ethylhexyl) phthalate	330	ND	ND
Chrysene	330	ND	ND
-Bromophenyl phenyl ether	330	ND	ND
∮enzo(a)anthracene	330	ND	ND
Di-n-octylphthalate	330	ND	ND
Tenzo(b)fluoranthene	330	ND	ND
∍nzo(k)fluoranthene	330	ND	ND
benzidine	2000	ND	ND
3.3'-Dichlorobenzidine	660	ND	ND
enzo(a)pyrene	330	ND	ND
indeno(1,2,3-cd)pyrene	330	ND	ND
Dibenzo(a,h)anthracene	330	ND	ND
∮enzo(ghi)perylene	330	ND	ND
enzyl Alcohol	660	ND	ND

⁼ Compound was detected in the blank.

te Received: August 18, 1988 te Reported: December 7, 1988

Work Order: 677
Job Number: OR001

f: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

ress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

o Number:	88081951	88081952
nple No.:	DANGB3-SS-A3,5	DANGB3-SS-D2
te Sampled:	08-17-88	08-17-88
ne Sampled:	12:33	15:11
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	1.1-28-88
rcent Moisture:	14	6

mpound	Detection Limits		al Results weight)
	ug/kg	ug/kg	ug/kg
stophenone	*	ND	ND
fline	*	ND	ND
Aminobiphenyl	~~*	ND	ND
Chloroaniline	660	ND	ND
Chloronaphthalene	*	ND	ND
senzofuran	330	ND	ND
Dimethylaminoazobenzen	3	ND	ND
12-Dimethylbenz(a)anth:	racene*	ND	ND
,a-Dimethylphenethylam	ine*	ND	ND
phenylamine	*	ND	ND
2-Diphenylhydrazine	*	ND	ND
hyl methanesulfonate	*	ND	ND
1ethylcholanthrene	*	ND	ND
thyl methanesulfonate	*	ND	ND
1ethylnaphthalene	330	ND	ND
Vaphthylamine	*	ND	ND
Vaphthylamine	*	ND	ND
√itroaniline	1600	ND	ND
Vitroaniline	1600	ND	ND
Nitroaniline	1600	ND	ND
Vitroso-di-n-butylamin	e*	ND	ND
Nitrosopiperidine	*	ND	ND
ntachlorobenzene	×	ND	ND
ntachloronitrobenzene	*	ND	ND
enacetin	*	ND	ND
Picoline	×	ND	ND
onamide	*	ND	ND
2,4,5-Tetrachlorobenze	ne*	ND	ND

⁻ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Late Received: August 18, 1988 Work Order: 877
Date Reported: December 7, 1988 Job Number: OR001

)R: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081951	88081952	
<pre>jample No.:</pre>	DANGB3-SS-A3.5	DANGB3-SS-D2	
ite Sampled:	08-17-88	08-17-88	
me Sampled:	12:33	15:11	
Date Extracted:	08-26-88	08-26-88	
Tite Analyzed:	11-28-88	11-28-88	
rcent Moisture:	14	6	

ompound	Detection Limits		LYTICAL RESULTS (dry weight)
COMPANY TO A COMPA	ug/kg	ug/kg	ug/kg
J.pha-BHC	 *	ND	ND
ımma-BHC	*	ND	ND
Beta-BHC	660	ND	ND
<pre>ptachlor</pre>	330	ND	ND
ૈકીta-BHC	500	ND	ND
Áldrin	330	ND	ND
deptachlor epoxide	330	ND	ND
adosulfan I	*	ND	ND
Šaeldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
% idrin	×	ND	ND
idosulfan II	*	ND	ND
4,4'-DDD	500	ND	ND
4'-DDT	830	ND	ND
🕯 idosulfan Sulfate	1000	ND	ND
Žndrin aldehyde	*	ND	ND
Endrin Ketone	×	ND	ND
llordane	2000	ND	ND
lethoxychlor	*	ND	ND
Toxaphene	2000	ND	ND
oclor-1016	2000	ND	ND
∉oclor-1221	2000	ND	ND
Āroclor-1232	2000	ND	ND
Aroclor-1242	2000	ND	ND
oclor-1248	2000	ND	ND
Froclor-1254	2000	ND	ND
Aroclor-1260	2000	ND	ND
전 전 전 전 전 전 전 전 전 전 전 전 ((((((((

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

te Received: August 18, 1988 te Reported: December 7, 1988

Work Order: 877 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

dress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

o Number:	88081951	88081952
nple No.:	DANGB3-SS-A3.5	DANGB3-SS-D2
te Sampled:	08-17-88	08-17-88
ne Sampled:	12:33	15:11
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-28-88	11-28-88
rcent Moisture:	14	6

mpound	Detection Limits		AL RESULTS veight)
	ug/kg	ug/kg	ug/kg
Chlorophenol	330	ND ND	ND ND
Nitrophenol	330	ND	ND
enol	330	ND	ND
4-Dimethylphenol	330	ND	ND
1-Dichlorophenol	330	ND	ND
4,6-Trichlorophenol	330	ND	ND
Chloro-3-methylphenol	660	ND	ND
4-Dinitrophenol	1600	ND	ND
6-Dichlorophenol	*	ND	ND
Methyl-4,6-Dinitrophenol	. 1600	ND	ND
ntachlorophenol	1600	ND	ND
Nitrophenol	1600	ND	ND
nzoic Acid	1600	ND	ND
1ethylphenol	330	ND	ND
& 4-Methylphenol	330	ND	ND
3,4,6-Tetrachlorophenol	*	ND	ND
4,5-Trichlorophenol	330	ND	ND

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

- Compound was detected in the blank.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Tate Received: August 18, 1988
Late Reported: December 7, 1988 Work Order: 877 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

気力

ab Number:	88081953	88081954	
Sample No.:	DANGB3-SS-D4	DANGB3-SS-A3	
Tate Sampled:	08-17-88	08-16-88	
ime Sampled:	15:45	14:10	
Date Extracted:	08-26-83	08-26-88	
ੂate Analyzed:	11-29-88	11-29-88	
∰ercent Moisture:	12	14	

	Detection ANALYTICAL RESU Limits (dry weight)				
- Contrast law.	ug/kg	ug/kg	ug/kg		
3,3-Dichlorobenzene	330	ND	ND		
,4-Dichlorobenzene	330	ND	ND		
Hexachloroethane	330	ND	ND		
줡is(2-chloroethyl)ether	330	ND	ND		
,2-Dichlorobenzene	330	ND	ND		
&-Nitrosodimethylamine	330	ND	ND		
Bis(2-chloroisopropyl)ethe	r 330	ND	ND		
-Nitrosodi-n-propylamine	330	ND	ND		
≥xachlorobutadiene	330	ND	ND		
1,2,4-Trichlorobenzene	330	ND	ND		
%itrobenzene	330	ND	ND		
sophorone	330	ND	ND		
Naphthalene	330	ND	ND		
Bis(2-chloroethoxy)methane	330	ND	ND		
-Chloronaphthalene	330	ND	ND		
Asxachlorocyclopentadiene	330	ND	ND		
Acenaphthylene	330	ND	ND		
<pre>#Cenaphthene</pre>	330	ND	ND		
imethyl phthalate	330	ND	ND		
2,6-Dinitrotoluene	330	ND	ND		
Fluorene	330	ND	ND		
,4-Dinitrotoluene	330	ND	ND		
biethyl phthalate	330	ND	ND		
N-Nitrosodiphenylamine	330	ND	ND		
exachlorobenzene	330	ND	ND		

⁼ Compound was detected in the blank.

te Received: August 18, 1988 Work Order: 877
te Reported: December 7, 1988 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

> Number:	88081953	88081954
mple No.:	DANGB3-SS-D4	DANGB3-SS-A3
te Sampled:	08-17-88	08-16-88
me Sampled:	15:45	14:10
te Extracted:	08-26-88	08-26-88
te Analyzed:	11-29-88	11-29-88
rcent Moisture:	12	14

mpound D	etection Limits		L RESULTS eight)
	ug/kg	ug/kg	ug/kg
enanthrene	330	ND	ND
thracene	330	ND	ND
putyl phthalate	330	ND	ND
uoranthene	330	ND	ND
Chlorophenyl phenyl ether	330	ND	ND
rene	330	ND	ND
tyl Benzyl phthalate	330	ND	ND
3(2-ethylhexyl) phthalate	330	ND	ND
rysene	330	ND	ND
Bromophenyl phenyl ether	330	ND	ND
nzo(a)anthracene	330	ND	ND
-n-octylphthalate	330	ND	ND
nzo(b)fluoranthene	330	ND	ND
azo(k)fluoranthene	330	ND	ND
nzidine	2000	ND	ND
3'-Dichlorobenzidine	660	ND	ND
nzo(a)pyrene	330	ND	ND
deno(1,2,3-cd)pyrene	330	ND	ND
penzo(a,h)anthracene	330	ND	ND
nzo(ghi)perylene	330	ND	ND
nzyl Alcohol	660	ND	ND

⁼ Compound was detected in the blank.

te Received: August 18, 1988 Work Order: 877
Date Reported: December 7, 1988 Job Number: OR001

r: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081953	88081954
Sample No.:	DANGB3-SS-D4	DANGB3-SS-A3
ite Sampled:	08-17-88	08-16-88
me Sampled:	15:45	14:10
Date Extracted:	08-26-88	08-26-88
Tite Analyzed:	11-29-88	11-29-88
Tite Analyzed: rcent Moisture:	12	14

ompound	Detection Limits		il Results veight)
1	ug/kg	ug/kg ` -	ug/kg
Instantane		ND	ND
:etophenone Liline	~~*	ND	ND
4-Aminobiphenyl	*	ND ND	ND ND
#-Chloroaniline	660	ND	ND ND
-Chloronaphthalene	~~*	ND ND	ND ND
Dibenzofuran	330	ND	ND ND
g_Dimethylaminoazobenzene	*	ND	ND
12 Dimethylbong 12 lanthy		ND	ND
12-Dimethylbenz(a)anthra- ,a-Dimethylphenethylamin	cenex	ND	ND ND
Diphenylamine	×	ND	ND
	× *	ND	ND
2-Diphenylhydrazine hyl methanesulfonate	~~* ~~*	ND	ND
3-Methylcholanthrene		ND	ND
Yothyl methanesulfonate	* *	ND	ND ND
-Methylnaphthalene	330	ND	ND
i-Naphthylamine	*	ND	ND
2-Naphthylamine	×	ND	ND
Nitroaniline	1600	ND	ND
Nitroaniline	1600	ND	ND
4-Nitroaniline	1600	ND	ND ND
Nitroso-di-n-butylamine		ND	ND ND
Nitrosopiperidine	~-*	ND	ND ND
Pentachlorobenzene	*	ND	ND
Rentachloronitrobenzene	~~*	ND	ND
enacetin	~~ *	ND	ND
-Picoline	*	ND	ND
Pronamide	*	ND	ND
2,4,5 Tetrachlorobenzene	=="	ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

te Received: August 18, 1988 Work Order: 877 te Reported: December 7, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

nple No.: te Sampled: ne Sampled: te Extracted: te Analyzed: rcent Moisture:		88081953 DANGB3-SS-D4 08-17-88 15:45 08-26-88 11-29-88	88081954 DANGB3-SS-A3 08-16-88 14:10 08-26-88 11-29-88 14
apound	Detection		AL RESULTS
	Limits	· -	veight)
	ug/kg	ug/kg	ug/kg
oha-BHC	*	ND	ND
nma-BHC	*	ND	ND
ta-BHC	660	ND	ND
otachlor	330	ND	ND
lta-BHC	500	ND	ND
irin	330	ND	ND
ptachlor epoxide	330	ND	ND
iosulfan I	*	ND	ND
∍ldrin	500	ND	ND
4'-DDE	1000	ND	ND
drin	*	ND	ND
iosulfan II	~-*	ND	ND
≟'−DDD	500	ND	ND .
i'-DDT	830	ND	ND
iosulfan Sulfate	1000	ND	ND
drin aldehyde	 *	ND	ND
drin Ketone	*	ND	ND
lordane	2000	ND	ND
choxychlor	*	ND	ND
kaphene	2000	ND	ND
oclor-1016	2000	ND	ND
oclor-1221	2000	ND	ND

EPA has not yet determined detection limits for these compounds.

2000

2000

2000

2000

2000

oclor-1232

oclor-1242

oclor-1248

oclor-1254

clor-1260

ND

ND

ND

ND

ND

ND ND

ND

ND

ND

Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Late Received: August 18, 1988 Date Reported: December 7, 1988

Work Order: 877 Job Number: OR001

DR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081953	88081954
ample No.:	DANGB3-SS-D4	DANGB3-SS-A3
ate Sampled:	08-17-88	08-16-88
Time Sampled:	15:45	14:10
ate Extracted: Analyzed:	08-26-88	08-26-88
📲 ate Analyzed:	11-29-88	11-29-88
Percent Moisture:	12	14

ompound	Detection Limits		AL RESULTS veight)
Ş	ug/kg	ug/kg	ug/kg
-Chlorophenol	330	ND	ND
2-Nitrophenol	330	ND	ND
[henol	330	ND	ND
,4-Dimethylphenol	330	ND	ND
2,4-Dichlorophenol	330	ND	ND
?,4,6-Trichlorophenol	330	ND	ND
-Chloro-3-methylphenol	660	ND	ND
1,4-Dinitrophenol	1600	ND	ND
2,6-Dichlorophenol	*	ND	ND
-Methyl-4,6-Dinitrophenol	. 1600	ND	ND
∍ntachlorophenol	1600	ND	ND
4-Nitrophenol	1600	ND	ND
Fanzoic Acid	1600	ND	ND
-Methylphenol	330	ND	ND
5- & 4-Methylphenol	330	ND	ND
2,3,4,6-Tetrachlorophenol	*	ND	ND
,4,5-Trichlorophenol	330	ND	ND

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

OTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

ate Received: August 18, 1988 Work Order: 877 ate Reported: December 7, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ddress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081955	88081956
ample No.:	DANGB3-SS-A1	DANGB3-SS-C0
ate Sampled:	08-16-88	08-16-88
ime Sampled:	13:35	10:55
ate Extracted:	10-28-88	10-28-88
ate Analyzed:	11-01-88	11-02-88
ercent Moisture:	14	14

ompound	Detection Limits		L RESULTS reight)	
	ug/kg	ug/kg	ug/kg	
,3-Dichlorobenzene	330	ND	ND	
,4-Dichlorobenzene	330	ND	ND	
exachloroethane	330	ND	ND	
is(2-chloroethyl)ether	330	ND	ND	
,2-Dichlorobenzene	330	ND	ND	
-Nitrosodimethylamine	330	ND	ND	
1s(2-chloroisopropyl)ethe	r 330	ND	ND	
-Nitrosodi-n-propylamine	330	ND	ND	
exachlorobutadiene	330	ND	ND	
,2,4-Trichlorobenzene	330	ND	ND	
itrobenzene	330	ND	ND	
sophorone	330	ND	ND	
aphthalene	330	ND	ND	
is(2-chloroethoxy)methane	330	ND	ND	
-Chloronaphthalene	330	ND	ND	
exachlorocyclopentaciene	330	ND	ND	
cenaphthylene	330	ND	ND	
cenaphthene	330	ND	ND	
imethyl phthalate	330	ND	ND	
,6-Dinitrotoluene	330	ND	ND	
luorene	330	ND	ND	
,4-Dinitrotoluene	330	ND	ND	
iethyl phthalate	330	ND	ND	
-Nitrosodiphenylamine	330	ND	ND	
exachlorobenzene	330	ND	ND	

⁼ Compound was detected in the blank,

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 18, 1988 Work Order: 877
Date Reported: December 7, 1988 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

physical state states as a

Lab Number: Sample No.:	88081955 DANGB3-SS-A1	88081956 DANGB3-SS-C0
Date Sampled:	08-16-88	08-16-88
	13:35	10:55
Time Sampled: Date Extracted:	10-28-88	10-28-88
Date Analyzed:	11-01-88	11-02-88
_Percent Moisture:	14	14

Compound D	etection Limits		AL RESULTS veight)
	ug/kg	ug/kg	ug/kg
Phenanthrene	330	ND	ND
*Anthracene	330	ND	ND
Dibutyl phthalate	330	ND	ND
Fluoranthene	330	ND	ND
4-Chlorophenyl phenyl ether	330	ND	ND
Pyrene	330	ND	ND
Butyl Benzyl phthalate	330	ND	ND
Bis(2-ethylhexyl) phthalate	330	590	ND
Chrysene 4-Bromophenyl phenyl ether	330	ND	ND
4-Bromophenyl phenyl ether	330	ND	ND
Benzo(a)anthracene	330	ND	ND ·
Di-n-octylphthalate	330	ND	ND
Benzo(b)fluoranthene	330	ND	ND
Benzo(k)fluoranthene	330	ND	ND
Benzidine	2000	ND	ND
3,3'-Dichlorobenzidine	660	ND	ND
Benzo(a)pyrene	330	ND	ND
Indeno(1,2,3-cd)pyrene	330	ND	ND
Dibenzo(a,h)anthracene	330	ND	ND
Benzo(ghi)perylene	330	ND	ND
Benzyl Alcohol	660	ND	ND

 $\frac{1}{2}$ B = Compound was detected in the blank.

Saute - Sinte

Page 3 of 5

Matrix: Soil (continued)

ate Received: August 18, 1988 Work Order: 877 ate Reported: December 7, 1988 Job Number: OR001

or: ES:Oak Ridge/Duluth ANGB ddress: 710 S. Illinois Ave, Suite F-103 ATTN: Mr. Bill Hayden

Oak Ridge, TN 37830

ab Number:	88081955	88081956
ample No.:	DANGB3-SS-A1	DANGB3-SS-CO
ate Sampled:	08-16-88	08-16-88
ime Sampled:	13:35	10:55
ate Extracted:	10-28-88	10-28-88
ate Analyzed:	11-01-88	11-02-88
ercent Moisture:	14	14

ompound	Detection Limits	-	al Results weight)
	ug/kg	ug/kg	ug/kg
cetophenone	*	ND	ND
niline	*	ND	ND
-Aminobiphenyl	*	ND	ND
-Chloroaniline	660	ND	ND
-Chloronaphthalene	*	ND	ND
ibenzofuran	330	ND	ND
-Dimethylaminoazobenzene	*	ND	ND
,12-Dimethylbenz(a)anthr	acene*	ND	ND
-,a-Dimethylphenethylami		ND	ND
1phenylamine	*	ND	ND
,2-Diphenylhydrazine	*	ND	ND
thyl methanesulfonate	*	ND	ND
-Methylcholanthrene	*	ND	ND
ethyl methanesulfonate	×	ND	ND
-Methylnaphthalene	330	ND	ND
-Naphthylamine	*	ND	ND
-Naphthylamine	~-*	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
-Nitroso-di-n-butylamine	 *	ND	ND
-Nitrosopiperidine	*	ND	ND
entachlorobenzene	*	ND	ND
entachloronitrobenzene	*	ND	ND
henacetin	*	ND	ND
-Picoline	+	ND	ND
ronamide	*	ND	ND
,2,4,5-Tetrachlorobenzen	.ex	ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: August 18, 1988 Work Order: 877 Tate Reported: December 7, 1988 Job Number: OR001

Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830 ATTN: Mr. Bill Hayden

Lab Number:	88081955	88081956
Sample No.: Date Sampled:	DANGB3-SS-A1	DANGB3-SS-CO
Date Sampled:	08-16-88	08-16-88
Time Sampled:	13:35	10:55
3Date Extracted: .	10-28-88	10-28-88
aDate Extracted: . Analyzed:	11-01-88	11-02-88
*Percent Moisture:	14	14

Compound	Detection Limits		YTICAL RESULTS dry weight)
	ug/kg	ug/kg `	ug/kg
Alpha-BHC	x	ND	ND
Gamma-BHC	 ★	ND	ND
₃ Beta−BHC	660	ND	ND
🖁 deptachlor	330	ND	ND
² Delta-BHC	500	ND	ND
Aldrin	330	ND	ND
ieptachlor epoxide	330	ND	ND
Endosulfan I	*	ND	ND
Dieldrin	500	ND	ND
; 1,4'-DDE	1000	ND	ND
Endrin	 ⋆	ND	ND
Endosulfan II	*	ND	ND
, 4 , 4 ' - DDD	500	ND	ND
1,4'-DDT	830	ND	ND
¹ Endosulfan Sulfate	1000	ND	ND
Endrin aldehyde	*	ND	ND
Endrin Ketone	*	ND	ND
Chlordane	2000	ND	ND
Methoxychlor	 *	ND	ND
: Toxaphene	2000	ND	ND
\roclor-1016	2000	ND	ND
Aroclor-1221	2000	ND	ND
Aroclor-1232	2000	ND	ND
% Aroclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND
Aroclor-1254	2000	ND	ND
₹Aroclor-1260	2000	ND	ND
Bluck of the state			

EPA has not yet determined detection limits for these compounds.

^{3 =} Compound was detected in the blank.

Friority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

ate Received: August 18, 1988 Work Order: 877 ate Reported: December 7, 1988 Job Number: OR001

OR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ldress:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

ab Number:	88081955	88081956
ample No.:	DANGB3-SS-A1	DANGB3-SS-C0
ate Sampled:	08-16-88	08-16-88
ime Sampled:	13:35	. 10:55
ate Extracted:	10-28-88	10-28-88
ate Analyzed:	11-01-88	11-02-88
ercent Moisture:	14	14

ompound	Detection Limits		L RESULTS eight)	
	ug/kg	ug/kg	ug/kg	
-Chlorophenol	330	ND	ND ND	
-Nitrophenol	330	ND	ND	
nenol	330	ND	ND	
,4-Dimethylphenol	330	ND	ND	
,4-Dichlorophenol	330	ND	ND	
,4,6-Trichlorophenol	330	ND	ND	
-Chloro-3-methylphenol	660	ND	ND	
,4-Dinitrophenol	1600	ND	ND	
,6-Dichlorophenol	*	ND	ND	
-Methyl-4,6-Dinitropheno	1 1600	ND	ND	
entachlorophenol	1600	ND	ND	
-Nitrophenol	1600	ND	ND	•
enzoic Acid	1600	ND	ND	
-Methylphenol	330	ND	ND	
- & 4-Methylphenol	330	ND	ND	
,3,4,6-Tetrachlorophenol	*	ND	ND	
,4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

= Compound was detected in the blank,

OTE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Work Order: 877 Tite Received: August 18, 1988
Lite Reported: December 7, 1988 Job Number: OR001

POR: ES:Oak Ridge/Duluth ANGB 710 S. Illinois Ave, Suite F-103 ATTN: Mr. Bill Hayden

Oak Ridge, TN 37830

ab Number:	88081957	88081958
Sample No.:	DANGB3-SS-C1	DANGB3-SS-C3
Tate Sampled:	08-16-88	08-16-88
Tite Sampled: Time Sampled:	11:25	10:25
Date Extracted:	08-26-88	08-26-88
Qate Analyzed:	11-29-88	11-29-88
∌rcent Moisture:	21	11

Compound	Detection Limits		L RESULTS reight)	
A regular dille	ug/kg	ug/kg	ug/kg	
1,3-Dichlorobenzene	330	ND	ND	
🖥 , 4-Dichlorobenzene	330	ND	ND	
ā exachloroethane	330	ND	ND	
<pre>3is(2-chloroethyl)ether</pre>	330	ND	ND	
,2-Dichlorobenzene	330	ND	ND	
🖁 -Nitrosodimethylamine	330	ND	ND	
Bis(2-chloroisopropyl)eth	er 330	ND	ND	
-Nitrosodi-n-propylamine	330	ND	ND	
exachlorobutadiene	330	ND	ND	
1,2,4-Trichlorobenzene	330	ND	ND	
alitrobenzene	330	ND	ND	
sophorone	330	ND	ND	
Naphthalene	330	ND	ND	
31s(2-chloroethoxy)methan	e 330	ND	ND	
-Chloronaphthalene	330	ND	ND	
Asxachlorocyclopentadiene	330	ND	ND	
Acenaphthylene	330	ND	ND	
[cenaphthene	330	ND	ND	
imethyl phthalate	330	ND	ND	
2,6-Dinitrotoluene	330	ND	ND	
Fluorene	330	ND	ND	
.4-Dinitrotoluene	330	ND	ND	
Biethyl phthalate	330	ND	ND	
N-Nitrosodiphenylamine	330	ND	ND	
**:xachlorobenzene	330	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

te Received: August 18, 1988 Work Order: 877
te Reported: December 7, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

ress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081957	88081958
nple No.:	DANGB3-SS-C1	DANGB3-SS-C3
ce Sampled:	08-16-88	08-16-88
ne Sampled:	11:25	10:25
ce Extracted:	08-26-88	08-26-88
te Analyzed:	11-29-88	11-29-88
ccent Moisture:	21	11

npound Detection Limits	Detection Limits		L RESULTS reight)	
	ug/kg	ug/kg	ug/kg	
nanthrene	330	ND	ND	
chracene	330	ND	ND	
outyl phthalate	330	ND	ND	
loranthene	330	ND	ND	
Inlorophenyl phenyl eth	ner 330	ND	ND	
rene	330	ND	ND	
tyl Benzyl phthalate	330	ND	ND	
<pre>3(2-ethylhexyl) phthala</pre>	ate 330	ND	ND	
rysene	330	ND	ND	
3romophenyl phenyl ethe	er 330	ND	ND	
nzo(a)anthracene	330	ND	ND	
-n-octylphthalate	330	ND	ND	
120(b)fluoranthene	330	ND	ND	
nzo(k)fluoranthene	330	ND	ND	
nzidine	2000	ND	ND	
5'-Dichlorobenzidine	660	ND	ND	
ızo(a)pyrene	330	ND	ND	
<pre>deno(1,2,3-cd)pyrene</pre>	330	ND	ND	
penzo(a,h)anthracene	330	ND	ND	
nzo(ghi)perylene	330	ND	ND	
nzyl Alcohol	660	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Lte Received: August 18, 1988 Work Order: 877 Date Reported: December 7, 1988 Job Number: OR001

ATTN: Mr. Bill Hayden

Fr: ES:Oak Ridge/Duluth ANGB Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081957	88081958
Sample No.:	DANGB3-SS-C1	DANGB3-SS-C3
ite Sampled:	^8-16-88	08-16-88
<pre>me Sampled:</pre>	11:25	10:25
Date Extracted:	08-26-88	08-26-88
ite Analyzed: rcent Moisture:	11-29-88	11-29-88
rcent Moisture:	21	11

Compound	Detection . Limits		al Results veight)
	ug/kg	ug/kg	ug/kg
:etophenone	*	ND	ND
liline	*	ND	ND
4-Aminobiphenyl	*	ND	ND
4-Chloroaniline	660	ND	ND
💈 - Chloronaphthalene	*	ND	ND
🗗 ibenzofuran	330	ND	ND
<pre>2-Dimethylaminoazobenzene</pre>	*	ND	ND
12-Dimethylbenz(a)anthra	cene*	ND	ND
🏞,a-Dimethylphenethylamin		ND	ND
Diphenylamine	*	ND	ND
<pre>2-Diphenylhydrazine</pre>	*	ND	ND
hyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	*	ND	ND
<pre>#ethyl methanesulfonate</pre>	*	ND	ND
<pre>Methylnaphthalene</pre>	330	ND	ND
	~~*	ND	ND
2-Naphthylamine	*	ND	ND
🧗 -Nitroaniline	1600	ND	ND
-Nitroaniline	1600	ND	ND
4-Nitroanilinê	1600	ND	ND
	*	ND	ND
🔹 -Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	*	ND	ND
gentachloronitrobenzene	- *	ND	ND
<pre> § lenacetin</pre>	*	ND	ND
∄Picoline	*	ND	ND
Pronamide	*	ND	ND
2,4,5-Tetrachlorobenzene	*	'ND	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

te Received: August 18, 1988 Work Order: 877 be Reported: December 7, 1988 Job Number: OR001

RES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

iress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081957	88081958
aple No.:	DANGB3-SS-C1	DANGB3-SS-C3
te Sampled:	08-16-88	08-16-88
ne Sampled:	11:25	10:25
ce Extracted:	08-26-88	08-26-88
te Analyzed:	11-29-88	11-29-88
rcent Moisture:	21	11

npound	Detection Limits		ICAL RESULTS y weight)
	ug/kg	ug/kg	ug/kg
oha-BHC	*	ND	ND
nma-BHC	*	ND	ND
ta-BHC	660	ND	ND
otachlor	330	ND	ND
lta-BHC	500	ND	ND
irin	330	ND	ND
otachlor epoxide	330	ND	ND
iosulfan I	*	ND	ND
∍ldrin	500	ND	ND
4'-DDE	1000	ND	ND
drin	*	ND	ND
losulfan II	*	ND	ND
l'-DDD	500	ND	ND
≟'-DDT	830	ND	ND
dosulfan Sulfate	1000	ND	ND
arin aldehyde	*	ND	ND
irin Ketone	*	ND	ND
_ordane	2000	ND	ND
thoxychlor	 ★	ND	ND
kaphene	2000	ND	ND
oclor-1016	2000	ND	ND
oclor-1221	2000	ND	ND
oclor-1232	2000	ND	ND
oclor-1242	2000	ND	ND
oclor-1248	2000	ND	ND
oclor-1254	2000	ND	ND
oclor-1260	2000	ND	ND

Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

Late Received: August 18, 1988 Date Reported: December 7, 1988

Work Order: 877 Job Number: OR001

DR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

<u>uab</u> Number:	88081957	88081958
imple No.: Lite Sampled:	DANGB3-SS-C1	DANGB3-SS-C3
<pre>#ate Sampled:</pre>	08-16-88	08-16-88
Time Sampled:	11:25	10:25
<pre>#ite Extracted: </pre>	08-26-88	08-26-88
Tite Extracted:	11-29-88	11-29-88
Percent Moisture:	21	11

mpound	Detection Limits	ANALYTICA (dry w		
	ug/kg	ug/kg	ug/kg	
₫-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
રૃhenol	330	ND	ND	
3.4-Dimethylphenol	330	ND	ND	
2,4-Dichlorophenol	330	ND	ND	
2.4,6-Trichlorophenol	330	ND	ND	
<pre>f-Chloro-3-methylphenol</pre>	660	ND	ND	
4-Dinitrophenol	1600	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
-Methyl-4,6-Dinitrophenol	1600	ND	ND	
ntachlorophenol	1600	ND	ND	
4-Nitrophenol	1600	ND	ND	
Renzoic Acid	1600	ND	ND	
.Methylphenol	330	ND	ND	
3- & 4-Methylphenol	330	ND	ND	
2,3,4,6-Tetrachlorophenol	*	ND	ND	
4,5-Trichlorophenol	330	ND	ND	

Analyst

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

3 = Compound was detected in the blank.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Work Order: 877 Job Number: OR001

ce Received: August 18, 1988 te Reported: December 7, 1988

ATTN: Mr. Bill Hayden

ES:Oak Ridge/Duluth ANGB

ress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number: 88081959 DANGB3-SS-A2 aple No.: te Sampled: 08-16-88 ne Sampled: 12:20 te Extracted: 08-26-88 te Analyzed: 11-28-88 rcent Moisture: 18

Detection ANALYTICAL RESULTS Limit (dry weight) ug/kg ug/kg 3-Dichlorobenzene 330 ND 1-Dichlorobenzene 330 ND <achloroethane 330 ND 330 3(2-chloroethyl)ether ND 330 2-Dichlorobenzene ND Vitrosodimethylamine 330 ND s(2-chloroisopropyl)ether 330 ND Vitrosodi-n-propylamine 330 ND kachlorobutadiene 330 ND 2,4-Trichlorobenzene 330 ND tropenzene 330 ND ophorone 330 ND onthalene 330 ND 5(2-chloroethoxy)methane 330 ND Inloronaphthalene 330 ND <achlorocyclopentadiene</pre> 330 ND anaphthylene 330 ND enaphthene 330 ND nethyl phthalate 330 ND 5-Dinitrotoluene 330 ND lorene 330 ND 4-Dinitrotoluene ND 330 ⇒thyl phthalate 330 ND Vitrosodiphenylamine -330 ND kachlorobenzene 330 ND

Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 18, 1988

Tite Reported: December 7, 1988

Work Order: 877 Job Number: OR001

ATTN: Mr. Bill Hayden

Dak Ridge/Duluth ANGB
Address: 710 S. Illinois Ave, Suite F-103
Oak Ridge, TN 37830

_ab Number: 88081959 imple No.: Lite Sampled: DANGB3-SS-A2 08-16-88 fime Sampled: 12:20 Tite Extracted: lite Analyzed: Percent Moisture: 08-26-88 11-28-88 18

mpound	Detection Limit ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
nenanthrene	330	ND	
Anthracene	330	ND	
ibutyl phthalate	330	ND	
luoranthene	330	ND	
E-Chlorophenyl phenyl ether	r 330	ND	
gyrene	330	ND	
Pyrene	330	ND	
31s(2-ethylhexyl)phthalate	330	ND	
Ihrysene	330	ND	
3 -Bromophenyl phenyl ether	330	ND	
∄⇒nzo(a)anthracene	330	ND	
Di-n-octylphthalate	330	ND	
₹÷nzo(b)fluoranthene	330	ND	
nzo(k)fluoranthene	330	ND	
Šenzidine	2000	ND	
3,3'-Dichlorobenzidine	660	ND	
nzo(a)pyrene	330	ND	
Andeno(1,2,3-cd)pyrene	330	ND	
Dibenzo(a,h)anthracene	330	ND	
₃nzo(ghi)perylene	330	ND	
tenzyl Alcohol	660	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Page 3 of 5 Base Neutrals - SW 8270 Matrix: Soil

(continued)

te Received: August 18, 1988 te Reported: December 7, 1988 Work Order: 877 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

D Number: 88081959 mple No.: DANGB3-SS-A2 te Sampled: 08-16-88 ne Sampled: 12:20 08-26-88 te Extracted: te Analyzed: 11-28-88 rcent Moisture:

mpound	Detection Limits ug/kg	Analytical Results (dry weight) ug/kg
etophenone	x	ND
iline	*	ND
Aminobiphenyl	*	ND
Chloroaniline	660	ND
Ihloronaphthalene	*	ND
penzofuran	330	ND
Dimethylaminoazobenzene	*	ND
12-Dimethylbenz(a)anthrace	ne*	ND
,a-Dimethylphenethylamine	×	ND
phenylamine	*	ND
2-Diphenylhydrazine	*	ND
nyl methanesulfonate	*	ND
Methylcholanthrene	*	ND
thyl methanesulfonate	×	ND
Methylnaphthalene	330	ND
Naphthylamine	*	ND
Vaphthylamine	~-*	ND
Vitroaniline	1600	ND
Vitroaniline	1600	ND
Nitroaniline	1600	ND
Nitroso-di-n-butylamine	*	ND
Nitrosopiperidine	×	ND
ntachlorobenzene	*	ND
ntachloronitrobenzene	*	ND
enacetin	*	N'D
Picoline	*	ND
onamide	 *	ND
2,4,5-Tetrachlorobenzene	*	ND

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Fate Received: August 18, 1988 Work Order: 877

Pate Reported: December 7, 1988 Job Number: OR001

DR: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 Tab Number:
 88081959

 Sample No.:
 DANGB3-SS-A2

 Ite Sampled:
 08-16-88

 Image: I

Compound	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
ipha-BHC	*	ND	
amma-BHC	*	ND	
Beta-BHC	660	ND	
<pre># ptachlor</pre>	330	ND	
} elta-BHC	500	ND	
Äldrin	330	ND	
deptachlor epoxide	330	ND	
idosulfan I	*	ND	
≟ıeldrin	500	ND	
4,4'-DDE	1000	ND	
idrin	*	ND	
ldosulfan II	*	ND	
≟,4'-DDD	500	ND	
🕯 , 4 ' - DDT	830	ND	
idosulfan Sulfate	1000	ND	
indrin aldehyde	*	ND	
Şndrin Ketone	*	ND	
llordane	2000	ND	
iethoxychlor	*	ND	
Toxaphene	2000	ND	
₹:oclor-1016	2000	ND	
coclor-1221	2000	ND	
Aroclor-1232	2000	ND	
Aroclor-1242	2000	ND	
coclor-1248	2000	ND	
Aroclor-1254	2000	ND	
Aroclor-1260	2000	ND	

 $[\]ddot{\ddot{\mathbb{B}}}$ = Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

te Received: August 18, 1988 te Reported: December 7, 1988 Work Order: 877 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

lress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 D Number:
 88081959

 nple No.:
 DANGB3-SS-A2

 te Sampled:
 08-16-88

 ne Sampled:
 12:20

 te Extracted:
 08-26-88

 te Analyzed:
 11-28-88

 rcent Moisture:
 18

npound I	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	
Chlorophenol	330	ND	
Vitrophenol	330	ND	
enol	330	ND	
i-Dimethylphenol	330	ND	
1-Dichlorophenol	330	ND	
4,6-Trichlorophenol	330	ND	
Chloro-3-methylphenol	660	ND	
4-Dinitrophenol	1600	ND	
5-Dichlorophenol	*	ND	
<pre>%ethyl-4,6-Dinitrophenol</pre>	1600	ND	
ntachlorophenol	1600	ND	
Vitrophenol	1600	ND	
nzoic Acid	1600	ND	
1ethylphenol	330	ND	
& 4-Methylphenol	330	ND	
3,4,6-Tetrachlorophenol	*	ND	
i,5-Trichlorophenol	330	ND	

Analyst

Laboratory Supervisor

⁻ Compound was detected in the blank.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Job No.:

THE REPORT OF THE PROPERTY OF

Client: ES! OAK RIDGE

Attn: Address:

Project: DuluT1+

TICs Found: 14

Project No: BLANK

Sample Matrix: 50/4 Cone. Unit: Mg/kg Work Order No: 87 Lab Sample ID: BLANK

Lab File ID: = 5797

Date Received: ~

Date Extracted: 8-26-88 Date Analyzed: 10/3/88

Date Reported: -Dilution Factor:/ % Moisture:--

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	Unknown	3,42	630	
	Unknown	3.46	530	
	Unknown	3.75	1200	
	Unknown	4.42	530	
	Unknown	4,55	1200	
	Unknown	4.89	530	
	Unknown	5.09	2400	
	Unknown	5,30	1700C	
	Unknown	6.39	330	1
	Unknown hydrocarbon	6.93	430	i e
	Unknown hydrocarbon	6.99	230	
	Unknown	21.73	330	
	Unknown	28.83	400	
	Unknown	35.09	8700	<u> </u>
		•		
		•	1	
			<u> </u>	<u> </u>
-				
مر در در در در در در در در در در در در در	22	77		
Statement line Heaven	Markey and appropriate or the second of		<u></u>	,,

Job No.:

Client:

Attm:

Address:

Project: DULU

7 TICS Found: 9

Project No: Sample Matrix: So: | Conc. Unit: pg /kg

Conc. Unit: mg/kg
Work Order No: 877
Lab Sample ID: BLANK Book 4 pg/6

Lab File ID: E 6065

Date Received: -

Date Extracted: 10-28-88 Date Analyzed: 11-2-88

Date Reported: Dilution Factor: 1

% Moisture: ___

CAS WOMER	COMPOUND KAME	R2 ;	EST, COMO.	. 2
:======================================		3.20	430	, ===:
֥	- unknown	3.51	700	<u> </u>
<u> </u>	Lukrown alkene my 98	4.51	876	-
·,·		4.29	1000	ļ ——
<u> </u>	- ank nown	4.49	7000	
<i>z</i>		4.94	14 000	<u> </u>
·		19.60	74 000	<u> </u>
/·		19.60	200 210	<u> </u>
~ <u> </u>		28.48	2.70	
_ 	<u> </u>	35.07	1300	· —
	<u> </u>			
· · ·				
·				
• • • • • • • • • • • • • • • • • • •				
· 5 .				·
i.é				
		·		. '
.:. <u> </u>				·
				:
	·			
				. – –
			·	
* *				
- 4				
				. —
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~				·
				' ; -
			•	· , ——
* * '	2378			
	23/0			. ;

Lab Name: Engineering Science contract:

EPA SAMPLE NO.

_		
1	DAN6133-	
1		1
1	55-D5	- 1

Lab C	ode: _	.Case	No.:	877.	SAS	No.:		SDG	No.:	************
-------	--------	-------	------	------	-----	------	--	-----	------	--------------

Lab Sample ID: 8808/943 REAM Matrix: (soil/water) 501/

30 (g/mL) gm Lab File ID: E632-8 Sample wt/vol:

Date Received: 8-18-88 Level: (low/med) low

Moisture: not dec. 16.9 Date Extracted: 8-26-88 Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 11/28/88

GPC Cleanup: (Y/N) / pH:____ Dilution Factor:

Number TICs found: 20

CONCENTRATION UNITS: (ug/L or ug/Kg)...a/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	_ in known	3,26	28-0	====
2	,	3,37	800	
3			360	
4.		3.74	490	
5		3 45	160	
6		3.95 4.50	320	
7		462	16000	
8		4,93	5600	
9		4.96	320	
10		605	960	
11		6.24	160	
12.		16,73	· ·	
12			160	
14 = 7 /0 = 3		18.41		
14. <u>57-10-3</u> 15. 57-11-4	octadecanois acid	23.60	3250	
3. 3./-//- 4	echadecanois acid	25.97	780	
16	unknewn	128,21	440	
17		31.58	22 40	
18		31.83	160	
17·		1 33.94	190	
١٠	<u> </u>	1 34,71	890	
۵۱۰		_	<u></u>	
22.			<u> </u>	
23		_	<u> </u>	
24				
25		1		
20. <u></u>				
21.				
28				
29				
30				

FORM I SV-TIC

Job No.:

Client: ES: OAK RIDGE

Attn: Address:

Project: DULUTH

TICs Found: 20

Project No: DANGB3-55-C5

Sample Matrix: 30/6 Conc. Unit: 45/ks

Work Order No: タヲフ Lab Sample ID: タョロを1944 RA

Lab File ID: 66364

Date Received: 8-18-88

Date Extracted: 8-26-88

Date Analyzed: 10/1/88

Date Reported:
Dilution Factor: 1

% Moisture: 128/08/1982 29

151-

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	Unknown	4.44	1600	
	Unknown	21,92	1900	
	Unknown	23.97	3600	
	Unknown hydrocarbon	25.16	14000	
	1 11	26,34	520	
	11	27.49	4700	
	Unknown	27.59	610	
	Unknown	27.69	12000	
	unknown	27.99	6100	
	Unknown	78.16	1300	
	Unknown	<i>₽8.88</i> .	850	
	Unknown	29,44	660	
	Unknown	29.93	800	
	Unknown	30,67	560	
	Unknown	. 30.93	560	
	Unknown hydrocarbon Unknown	31.93	1100	
	Unknown hydrocarbon	31.57	1700	
	Unknown	<i>33.9</i> ⊋	240	
	1 // /	34.66	1800	
	Unknown hydrocarbon	37,22	420	
	/	37,69		
		<u> </u>		
	Substitution of the substi	a napapaka matembahan dan pakaban dan pakaban dan pakaban dan pakaban dan pakaban dan pakaban dan pakaban dan p	* * \$(\$1.7.7)	· · · · · · · · · · · · · · · · · · ·
· 		m merum 1980 daninga dipandana ata agginaganya, ya		
		· :		
		;		

2380

Man - illia-non '

Job No.:

Client: ED: OAK RIDGE

Attn: Address:

Project: DULUTH

TICs Found: 2/

Eroject No: DANGB3-55-A4

-- 7.4 35.40. c

Sample Matrix: 50/6 Conc. Unit: 49/69 Work Order No: 875

Lab Sample ID: 3508/945

Lab File ID: E58.05
Date Rec:ived: 8-18-88
Date Ext.acted: 8-26-88
Date Analyzed: 10/5/8-2

Date Reported:
Dilution Factor: /

% Moisture: //

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	Unknown	4.33	3000	
	Unknown	4,53	2300	
	Unknown	4.8-9	590	
		6.28	260	
		6.41	440	
		6.60	200	
		6.68	220	
	V	6.95	330	
		23.99	180	· · · · · · · · · · · · · · · · · · ·
57-10-3	Hexadeconoic Feid	24.16	2500	
	Unknown	26.53	370	
		28,82	1100	
7-124		29.49	300	
		31,70	630	
	<u> </u>	. 32.160°	410	
	1 🗼	33.12	370	
		77.70	370	
	Unknown hydrocarbon	34.46	440	
······································	Unknown	35,35	30,000	
	Unknown	36.63	410	
	IUnknown		300	
	1			
	1			
	1			
-				
	5004		į	

2381

Job No.:

Client: ES! OAK RIDGE

Attn:

Address:

Project: DuluTH

TICs Found: 22

Project No: DONGB3-55-A5

Sample Matrix: 50/L

Conc. Unit: Malk's

Work Order No: 877

Lab Sample ID: 8808/946 RA

Lab File ID: 506 %
Date Received: 8-18-88

Date Extracted: 8-26-88
Date Analyzed: 12/12/58

Date Reported:

Dilution Factor: /

% Moisture: 5%

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	Unknown	3.32	5100	
	Unkerown	3.47	4100	
		3,72	2300	
	<u> </u>	3,85	3000	
		4,00	5500	
- 7		4.9%	40000	
		5.07	3000	
		5.46	30,000	
		5.66	14,000	
		6.05	4400	
57-10-3	Hexadecanoic Heid	24.99	3500	
	Unknown Lydrocarbon	25,59	2700	· · · · · · · · · · · · · · · · · · ·
	Unknown hydrocarbon	26.63	2200	
	<u> </u>	28.95	1700	
	Unknown	. 39.21	7300	
···	Unknows	29,50	4700	
		29.61	1900	
	<u> </u>	29.86	1400	
இது அண்ணுள்ள வரும் உள்ள உள்ள	Unknown Ludrocarbon	33.37.	1900 i	
 	Unknown '	33,69	4200	
ga des company and decomposition	,	41.14	1700	
	_ _ V	41.54	3000	
1 No. 207 - 2000, 1 10 10				
		The statement of the st		
p magazine nga cenanda a a agus				
	,	1		
**				······································
		<u> </u>		. —
	- ASSA	i		

2382

Job No.:

Client: Attn:

Address:

Project:

TICs Found: /7

Sande Project No:

Sample Matrix: So:
Conc. Unit: mg/kg
Work Order No: 877
Lab Sample ID: 577

Lab File ID:5 0261

Date Received: 8-18-88

Date Extracted: 8-26-88

Date Analyzed: /0-27-88

Date Reported:

Dilution Factor: /-

% Moisture: /3

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	unknown	4.35	960	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Williamine	4,78	1100	
	Uwknown	5.05	7700	
مسرور فرمينتين والإنالة المساور	Uknown	5,79	7300	
	UNKNOWIT	5,85	10,000	··
	VW(AD. 11)	7,12	1100	
	Uzzkinowin	7,22	2705	·
	undrown .	70:	2300	···
	with a dilater bond	18.16	690	
	proside anoic neid	.	1700	
	1 Direction	29.75	600	
-	UNKARUS	200	900	
	1 · 12/10 cm 1	-12	340	···
,	ONLASION Ayirocarbon		27 <i>0</i> .	w
	UNKNOWN COOP	37.47	260	
83-1 -412	2383	38,15	//00 5 /0 TI-ERMO:	

5 70 TI-FRMO:

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUN	NDS 1	DANSB3 - 1
Lab Name: Engineering Science contract:		55-42
Lab Code:Case No.: 877 SAS No.:	EDG 1	No.:
Matrix: (soil/water) Soil	Lab Sample ID:	88081948
Sample wt/vol: 30 (g/mL) q m	Lab File ID:	E6329
Level: (low/med) low pally	Date Received:	8-18-88
Moisture: not dec. 212 dec.	Date Extracted	<u>: 8-26-88</u>
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed:	11/28/88
. 1	Dilution Facto	

Number TICs found: 20

CONCENTRATION UNITS: (ug/L or ug/Kg): La Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	unKnown	3.90 #39	3700	
2		4,39	2400	1
31		464	7600	1
4.		1 4.84	3900	1
5		1 6.04	1000	.
6.	<u> </u>	23.43	340	.
7. 57-10-3	hexadocanoic acid	123.64	3300	.
·	- un Known	1 23.80	960	.!
9		24.89	550	.!
10		25.18	890	. !
L L •	· V	25.73	420	. !
12	octadecanoic acid	26.00	570	.!
1).	unknown	27.49	1/00	. !
14		28.18	380	.!
15.		128,31	1 1300	- !
16		31.58	460	-!
17		31.81	720	-
18		33.96	630	-!
19!		- 3 'S	7800	-!
20	<u> </u>	<u> </u>	820	-
21		!		-
22				-
23		!		-
24		!	.	-
25			.	-
26		!	.	-
61.				-¦
20		!	.	·¦
29 30		!	.!	-!

FORM I SV-TIC

EPA	SAMPLE	NO.
-----	--------	-----

DANG	B	3 - 1
55	-	B.2

Lab Name: Engineering Science contrac	st: <u>\$5-B2</u>
Lab Code: Case No.: 877 SAS No	o.: SDG No.:
Matrix: (soil/water) 50//	Lab Sample ID: <u>88081949 REANA</u>
Sample wt/vol: 30 (g/mL) gm	Lab File ID: <u>£6330</u>
Level: (low/med) low	Date Received: 8-18-88
* Moisture: not dec. 24.7 dec.	Date Extracted: 8-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 11/28/88
GPC Cleanup: (Y/N) PH:	Dilution Factor:/
CONC	CENTRATION UNITS: /.,

Number TICs found: 22

(ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	in tronger	3.87	3400	
2		3.98	1950	
3.		4.34	1900	
4			560	
5		5.26	1500	
6		1 6.47	1200	
7	_l	6.82	1_1200	
8. 57-10-3	1 hexadecanoic acid	23.64	3300	
9	1 unknown aromati - mellet, 226	24, 83	536	l
10	1 untrown	25.08	1_720	
±4.	<u> </u>	25.72	220	l
12. 57-11-4	octadécanine acid	2600	238	l
13.	1 un Kreen	27.49	222	
14		1 22.85	1 440	l
15		28,32	1200	
16		31,77	360	
1/		34.31	500	
18.		34.83	1/20	i
19		36.26	340	
20	_	37,33	3/0	1
21		1		
22				
23.				1
24.				1
25.		1		
26.				
27.		i		
28.				<u> </u>
29.	1	i ———		i
30.				i
	1	1		;

FORM I SV-TIC

Job No.:

Client: ES! OAK RIDEE

Attn: Address:

Project: Duluth

TICs Found:

Sample Project No: DRNGB 3-55-A2.5

Sample Matrix: 50/4 Conc. Unit: A5/K5 Work Order No: 877

Lab Sample ID: \$308/950

Lab File ID: E5877
Date Received: 8-18-98
Date Extracted: 8-26-88
Date Analyzed: 10/5/38

Date Reported:
Dilution Factor: /
% Moisture: /
#

CAS NUMBER	CCMPOUNE NAME	RT	EST. CONC.	l q
	Unknown	4.36	4700	
		4.83	700	
		4.96	230	
		5,21	20,000	
		6.33	660	
		6.41	430	
		6.50	2000	
		6.65	660	
	V	6.97	430	
	Unknown hydrocorbon	7,02	<u> </u>	
57-10-3	Unknown hydrocorpon Hexadecancic Red	24.16	2300	
	Unknoun	.26.55	200	
		28.83	780	
		29.18	1600	
		. 30,99 i	430	
		34,47	200	
		1		
· · · · · · · · · · · · · · · · · · ·	У		20,000	
	1 1	36.66	230	
		 		
		<u> </u>		
		:	· · · · · · · · · · · · · · · · ·	
			, ., .,	
			. ,	
		· material de 126 i represe de		
				·
1	and the same of th	;		** ****

2386

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

mark offer and to	EPA	SAMPLE	NO
-------------------	-----	--------	----

TENTATIVELY IDENTIFIED COM	1 204.000
Lab Name: Engineering Science contra	act: A35
Lab Code: Case No.: 877 SAS	No.: SDG No.:
Matrix: (soil/water) Soil	Lab Sample ID: <u>8808 1951 REA</u>
Sample wt/vol: 30 (g/mL) gm	Lab File ID: <u>E633/</u>
Level: (low/med) low	Date Received: 8-18-88
* Moisture: not dec. 13.6 dec.	Date Extracted: 8-26-88
Extractic (SepF/Cont/Sonc) Sonc	Pate Analyzed: 11/28/88
GPC Cleanup: (Y/N) N pH:	Dilution Factor: /

Number TICs found: 30

CONCENTRATION UNITS: Kg

			ע ונ	
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q Q
1	1 un Known	3.97	3.70	
2.	i	4.47	350	
3.		2.87	97800	1
4.	i v	16.04	1890	i ——
5. 57-10-7	I hexadecanoic acid	23.66	3160	
6. 57-11-4	1 cetadocancia acid	26.00	420	
7.	1 cm known	127.61	190	
8		128.29	1700	
9.		28.39	1900	
10.	i	31 57	580	1
11.	-	1:31.49	1 4/20	1
14.	1	32.27	220	
13		132,57	350	1
14.		33,17	1 470	1
15	,	1 33.96	1 680	1
10.		134.89	1 3 ien	1
1/	1	35 22	300	1
18.	-	3628	1 810	1
19.	1	37.3c	364	
20	1Y	1 40.65	260	
21.				l
22				1
23				
24				1
25				1
26.				1
27				1
28				
29				1
30,				1
				1

FORM I SV-TIC

EPA SAMPLE NO.

ļ	DANGB	3 -	- 22	- ;
1	-	7,2	Ļ	

Lab Name: Engineering Science contract	:
Lab Code:Case No.: 877 SAS No.	: SDG No.:
Matrix: (soil/water) <u>Soil</u>	Lab Sample ID: 8808/952 REAM,
Sample wt/vol: 30 (g/mL) am	Lab File ID: E 6332
Level: (low/med) low	Date Received: 8-18-88
Moisture: not dec. 5.9 dec.	Date Extracted: 8-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 11/28/88
GPC Cleanup: (Y/N) N pH:	Dilution Factor:/

concentration units: (ug/L or ug/Kg). reg/Kg

OLC MEMBER	I COMPOSITION ASSESSED	•••	I From CONC	_
CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	unksconn	3,97	140	
2.		1_3, //	210	
3.		3,39	250	
4		1 3.50	180	
5		1 4/0	4600	
6		1 824	180	l
7	l	1 <u>453</u>	1,280	l
8		1 4.92	1 4990	l
9	I	5.73	466	l
10.		1.5,99	3.36	l
11	1	6,13	1 <u>/8</u> c	!
12.	l	1 8.84	1 143	l
13. ジブー/0・3	1 hexadecanor acid	133.65	1 2/50	l
14.	1 un Fronih	1 = 28.26	1 yac	
15	. I	129,48	1 720	l
16.	I	134.77	1 893	<u> </u>
17		1375	1 160	ļ
18.	-			
19.				!
20	.			!
21			.	!
22.				!
23	.			!
24.	.		, I	!
25.				!
26	.			!
27	.	1		!
28			. I	!
29		_	.1	I
30.				1

FORM I SV-TIC

EPA	SAMPLE	NO
-----	--------	----

1DAN633-

Lab Name: Engineering Science Contract	:
Lab Code:Case No.: 877 SAS No.	: SDG No.:
Matrix: (soil/water) 501/	Lab Sample ID: 88081953 REANA
Sample wt/vol: 30 (g/mL) gm	Lab File ID: E 6345
Level: (low/med) low	Date Received: 8-18-88
Moisture: not dec. 19.0 dec.	Date Extracted: 8-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 11/29/88
GPC Cleanup: (Y/N) M pH:	Dilution Factor:/

Number TICs found: 19

CONCENTRATION UNITS: (ug/L or ug/Kg)

COMPOUND NAME	RT	EST. CONC.	Q =====
un Kristen	3.04	.380	
	3,35	450	
	3,98	1600	
	4.14	450	
	1 4114	1000	
	1 488	23000	
,	14,91	230	I
	5.87	230	
		420	1
. Y		490	1
heratecantic ocid		1660	
un Known	28.23	1.40	
1	28.67	190	
	37.55	190	
i	33.12	ike	i
1			i
			i
	35.04	·	i
Ż Ż	36.10		
	1 20.10		i ———
	i	- i	<u> </u>
		-	i ———
		-	i
			i
			¦
		-	i
		-	¦
			¦
		-	!
	{		!
	1	1	ł
	COMPOUND NAME Un Kritish hera decantic acid un Kritish I have the control acid un Kritish I have t	3.04 3.35 3.98 4.14 4.14 4.14 4.19 4.19 5.87 6.01 9.19 huga decanaic ocid 23,56	COMPOUND NAME RT EST. CONC. 11

FORM I SV-TIC

EPA SAMPLE NO.

JANG83-	•
55-13	1

Lab Name: Engineering Science contract:	55-43
Lab Code: Case No.: O// SAS No.:	: SDG No.:
Matrix: (soil/water) 501/	Lab Sample ID: 8808/954 REANAL
Sample wt/vol: 30 (g/mL) gm	Lab File ID: E 6346
Level: (low/med) low 2019	Date Received: 8-18-58
Level: (low/med) low 31119 Moisture: not dec. 14/4 dec.	Date Extracted: 6-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 11/29/88
GPC Cleanup: (Y/N) M pH:	Dilution Factor:/

Number TICs found: 18

concentration units: (ug/L or ug/Kg): reg/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	w.known	3.47	1300	
2.		4.56	190	
3.		4.80	12000	
4.		5.93	160	
5.	V	6.05	23%	
6. 57-10-3	hexa deca nose acid	2365	1 9900	
7.57-11-4	octadecamoic acid	25.98	<i>35</i> 0	l
8.	unknown	38.94	820	l
9		1 28.55	270	l
10.		28.87	3,0	l
11.	·	31.57	430	l
12.		32.50	760	1
13.		33.13	350	1
14		33,9z	2606	1
15.		34,84	334c	
16.		35,09	160	
17.		36,22	580	
18	V	37.24	3/0	1
19.				1
20				
21.		<u> </u>		
22.				1
23.				
24.				
25.		<u> </u>	-	1
26.				1
27	<u> </u>	<u> </u>	-	i
28.				i —
28.		¦		i
30.			-	i
			-	i

FORM I SV-TIC

Job No.:

Client: ES! CAK RIGDE

Attn: Address:

Project: DucuTH

TICs Found: /3

Samole Project No: DANGB3-55/A1

Sample Matrix: 50/2 Conc. Unit: HA/KE Work Order No: 877

Lab Sample ID: 8808/955 RE-EXTRACT

Lab File ID: E6057

Date Received: 8-18-88 10 10-28-58

Date Analyzed: 11/4/88

Date Reported: Dilution Factor: / % Moisture: 14

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Ç
	Unknown	3.00	2700	
	Unkrouso	3,52	510	
	UnFnown	4.11	1400	
	LINKHOWE	41.29	1000	
	Unknown	4,68	1200	
	Unknown	5.0.2	<i>30,000</i>	
	Unknown	6.15	4/70	
	//nknown	25.41	940	
	Unknown	27.71	200	
	Unknown	29.49	1600	
	Unknown	08.86	200	
	Unknown	31.85	390	
	Unknown	32.86	270	
		•		
and the second second second second				
and the same of th				
	1			

2391

Job No.:

Client: FS! OAK RIDGE

Attn: Address:

Project: DULUTH

TICs Found: /b

Sample Project No: DAN683-55-00

Sample Matrix: Soil

Conc. Unit: MS/KS Work Order No: 50/2 877

Lab Sample ID: 88081956 RE EXTRACT

Lab File ID: E6058

Date Received: 8-18-18 -- Date Extracted: 8-26-88 10-28-88

Date Analyzed: 11/2/58

Date Reported: Dilution Factor: / % Moisture: /4

AS YUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	Unknown	3.92	430	
	Unknown hydrocarbon	3,99	550	
	Unknown hydrocarben	4.09	270	
137-18-4	Tetrachloro etheno	4,25	230	
	Unknown	4,42	200	
	Unknown 1.1,2,2-Tetrachloroethane	4.81	5100	
79-34-5	1.1,2,2-Tetrachloroethone	6.07	230	
	Unknown	6,00	860	
	Unknown	25.79	<i>ఎ</i> 00	
	Unknown hydrocarbon	28.48	1500	
	Unknown hydrocarbon	28.80	390	
	Unknown ester Unknown hydrocarban	30.39	3/0	
	Unknown hydrocarbon	31.85	200	
	Unknown	32.86	950	
	Unknown	. 35,13	3400	
	Unknown	37,82	620	
				-
		;		
		1		
				· · · · · · · · · · · · · · · · · · ·
	or the second se		The state of the s	
			*	
* a week the plong of the course on the		· · · · · · · · · · · · · · · · · · ·		

EPA SAMPLE NO.

1	DANGB	3-	١
	55-	CI	1

Lab	Name: Engine	ering Sc	ience	Contract:	<u> </u>
Lab	Code:	.Case No.:	877.	SAS No.:SI	G No.:

Matrix: (soil/water) 501/ Lab Sample ID: 8608 1957 ZENIAL

Sample wt/vol: 30 (g/mL) gm Lab File ID: E6347

Level: (low/med) low Date Received: 8-18-88

* Moisture: not dec. 214 dec. Date Extracted: 8-26-88

Extraction: (SepF/Cont/Sonc) Sonc Date Analyzed: 11/29/88

GPC Cleanup: (Y/N) M pH: Dilution Factor: __/

Number TICs found: 20

concentration units: (ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	Luc Kuown	3.33	970	
2		1 407	<u> ६५० ०</u>	
3		1 4.19	/25 c	l
4		1 4.52	2600	l
5		1 5,96	30000	l
6			680	l
7.	li	6.10	1000	l
8	l	1 <u>862</u>	1_380	١
9. 57-10-3	1 hexadecanoic acid	1 23.63	1 3000	l
0	in Known	1 27.45	1 3,40	l
٠.٠	<u> </u>	1 28.26	5/8	١
2	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	128 47	2450	١
.J.	unknowing phthe late	30,13	1 360	I
.4 •	- un Known	31.51	1 1800	1
5		32,65	550	I
6		133.15	1_720	1
.7		35.96	1_1700	I
۔		1 39.81	1 1800	1
.9		136.26	1 840	1
υ.	IV	137.29	760	1
1.		l		l
2.				l
3		1		I
4	1			1
:5				1
6		1		1
7.				1
8.				1
9.				1

FORM I SV-TIC

EPA SAMPLE NO.

ľ	JANEB 3-	1
	55-03	

Lab Name: Engineering Science Contract	:iii
Lab Code:Case No.: 877 SAS No.:	: SDG No.:
Matrix: (soil/water) <u>Soil</u>	Lab Sample ID: <u>88081958</u> REANA
Sample wt/vol: 30 (g/mL) gm	Lab File ID: E 6348
Level: (low/med) low	Date Received: 8-18-88
Level: (low/med) low low dec. /// dec.	Date Extracted: 8-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 11/24/88
GPC Cleanup: (Y/N) M pH:	Dilution Factor: //

Number TICs found: 18

CONCENTRATION UNITS: (ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	 Q
1.	un Known	3,29	220	
2.		3,33	1000	
3.		101	3800	
4.		4.13	490	
5.		4.46	2000	
6.		4.66	2900	
7.		5.89	49 v	
8.		6.04	560	<u> </u>
9.		629,24	340	
10. 57-10-3	nexaderamic acid	23.62	2200	
11. 57-11-4	cctade canoic acid	25.96	260	i
12.	unknown aromotic -molwy 266	27.60	450	i
13.	Luckysum aromalis - molini, 286		260	i
14.	1 un Enerun	28.34	900	i
14.	in Kurum philiplata Bis	28.54	530	
15. 16.	untrown sothalate	30,12	250	i —
17.	unknown	34.84	2000	¦
17.		37.24	290	<u> </u>
18.	- un known	\ <u></u>	1 - 3-/ 0	<u> </u>
20		-¦	<u> </u>	¦
21.		- {		<u>'</u>
22		-	!	¦
22		-¦	!	i
23.		-	!	¦
24.		-	!	¦
25		-	ļ	¦
26.		·	!	-
27.		-		¦
20		- !	!	¦
29.		-		!
30.		. !	ļ	

FORM I SV-TIC

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

DAN6B3-	
55-AQ	-

Lab Name: Engineering Science Contract	:
Lab Code: Case No.: 877 SAS No.	: SDG No.:
Matrix: (soil/water) 501/	Lab Sample ID: 88081957 REAMAL
Sample wt/vol: 30 (g/mL) gm	Lab File ID: <u>E 6333</u>
Level: (low/med) low	Date Received: 8-18-88
* Moisture: not dec. 17.7 dec	Date Extracted: 8-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed:
GPC Cleanup: (Y/N) / pH:	Dilution Factor: /

Number TICs found: 20

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	unknown	3.41	490	
2	1	3.77	1/50	
3.		3.48	2000	
4.		1 4,46	1500	1
5	ı	1 4.7/	6500	1
6	1	5.05	6.50	1
7.	y .	6,10	1700	1
8. 57-10-3	Neva de camere a cid	23.64	, ±000	1
9. 57-11-4	Meradecanois a cid	25.99	250	1
9. 57-1/-4	in known	28,27	570	
1.	* ;	125.41	20+0	i
2		128,50	3:20	1
3		30,15	640	1
4		3159	360	1
5.		32,59	250	
6.		33 75	280	1
7		34.81	1600	i
8		35,24	400	1
9.	,	36.28	chin	1
0	V	37,30	520	1
1	······································			1
2.		i		1
3.				1
4.		i		
5		<u> </u>		1
6				1
7		 		i
ε				i
0 1		¦		i
ō:			<u> </u>	;

FORM I SV-TIC

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0056-88

08-18-88 08-26-88 10-06-88 04 - 21 - 89

Date Received: Date Prepared: Date Analyzed:

Conc. Unit:

NA

Dilution Factor: Date Reported:

%Moisture:

ug/KG Soil

Sample Matrix:

QC Report No:

OR001 Job No.: ES Oak Ridge client:

Bill Hayden Attn:

710 S. Illinois Avenue Address:

Suite F-103

37830 Oak Ridge, In. Duluth ANGB

Project:

QC Report for Laboratory Sample No(s): 88081591Re, 88081593Re

88081943-88081959

2396

Supervisor Approval: Laboratory

•							-			
Fraction	Compound	SA	SR	SW	PR	MSD	PR	RPD	EPA RPD	QC Limit %Recovery
	1,2,4-Trichlorobenzene	4060	ND	2030	50	2100	52	3	23	38-107
B/N	Acenaphthene	4060	N	2140	53	2220	52	4	19	31-137
Laboratory	Laboratory 2,4-Dinitrotoluene	4060	QN	2190	54	1760	43	22	47	28-89
Sample #	Pyrene	4060	ND	2130	52	2180	54	7	36	35-142
88081959	N-Nitroso-di-n-Propyl aine	4060	N	1890	46	1990	49	ເດ	38	41-126
	1,4-Dichlorobenzene	4060	ND	1600	39	1630	40	2	27	28-104
	Pentachlorophenol	8130	ND	5940	73	6040	74	2	47	17-109
ACID	Phenol	8130	ND	3630	45	3270	40	10	35	26-90
Laboratory	Laboratory 2-Chlorophenol	8130	ND	3630	45	3460	42	വ	20	25-102
Sample #	4-Chloro-3-Methylphenol	8130	ND	5410	99	5540	89	7	33	26-103
88091959	4-Nitrophenol	8130	ND	6420	79	6400	79	<1	20	11-114

If % moisture is reported, results are presented on a dry-weight basis.

MSD = Spike Duplicate MS = Spike Sample X 100 (MS + MSD)/2- MSD MS | | Relative Percent Difference (RPD)

 $= (MS \text{ or } MSD) - SR \times 100$

Percent Recovery (PR)

Sample Result !!

NA = Not Applicable

Calculated Detected

Not

NC = Not

Spike Added (Concentration)

QC-FRM1S

METHOD BLANK SUMMARY

Tallette A

Printiples (co.)

duvering a state a

Pressing School

f and the state of

P. 48LOTEPALO

SOLID LAND

.

CARRIE ACTUALS

white man

Every with

Act and official,

L. skyllenbyt. 4

OR001 Job No: Client:
Attn:
Address:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103

37830 Oak Ridge, Tn.

Duluth ANGB Project:

877 Work Order No.: Soil

ug/KG 12-07-88 Sample Matrix: Conc. Unit: Date Reported: Laboratory Supervisor Approval:

Inclusive Sample Nos.	88081898-88081906 88081938-88081942 88081943-88081959	
CRDL	t	
Conc	t	
Compound (HSL, TIC or Unknown)	None Detected	
CAS Number	ı	
Instru- ment ID	2	
Instru- Fraction ment ID	BNA	
Date Analyzed	10-03-88	
File ID	E5797	2397

418.1 INITIAL & CONTINUING CALIBRATION DATA

Job No.:

ORO 01

Calibration Date:

9-14-88

Client:

ES Oak Ridge

Instrument I.D.:

Perkin Elmer 257

Attn:

Grating Infrared Spectrophotometer

Address:

Bill Hayden 710 S. Illinois Avenue

Unit:

mg/L

Suite F-103 Oak Ridge, Tn. Date Reported: R=

11-09-88 0.9994

Project:

Duluth ANGB.

Laboratory Supervisor Approval:

Laboratory Sample No(s).:

88081947-88081959

37830

Standard	Concentration	Absorbance	/Continuous RF /Calibration /Verification
No. 1	0.59	0.118	
No. 2	1.2	0.218	RF = 6.46
No. 3	1.8	0.301	
No. 4	2.4	0.401	
Cont. Cal. No. 2 (88081947)	1.2	0.213	100%
Cont. Cal. No. 2 (88081948-88081952)	1.18	0.210	98%
Cont. Cal. No. 2 (88081953-88081959)	1.2	0.215	100%
	•		

SEMIVOLATILE METHOD BLANK SUMMARY

4B

Job No.:

Client:

Attn:

Address:

Work Order No.:

Lab Sample No.: 03-57

Lab File ID: Es797 (continued)

Matrix: Soil Level (low/med):

Date Analyzed: 10-3-88 Time Analyzed: 18'18

Instrument ID: Date Reported:

Project: Dulth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
DANG03 - 55 - D5	188081943	S0180, E6328	10-15-88, 11-28-88
-05	188681944	50197, EE3EY	10-12-88,12-1-88
~ A4	88081945	E5825	10-5-88
-A5	1 88081946	E5826,50696	1/0,-5-88, 12-12.82
- 22	88081947	65844,50261	10-11-88 10-27-85
-Y2	1 88081048	Sc189, E6329	10-12-88, 11-28-88
- 8 ಎ	1 88081949	SU190, E6330	10-17-88, 11-28-88
-A2.5	1 8808195C	ES827	10-5-88
-A3.5	58081951	Sc191, E6331	10-13-83, 11-28-88
- D2	.1 88081952	S0192, E6332	10-17-88,11-28-8
- Ън	88081953	50181, E6345	10-15-88, 11-29-88
- A3	88081954	50193, E6346	10-17-88, 11-29-88
-AI	88081955	50182	10 15-88
-eo	1 88081956	80183	10 - 15-88
-01	88081957	SU194, E 6347	10-17-88 ,11-29-88
-03	88081953	SU195, E2348	10-17-88,11-29-88
_A2	88681959	50196, E6333	10-17-83, 11-28-88
	88081959 MS	50141	10-6-88
\\	8878 k126 W7D	50142.	10-6-88
89-AAAANNNN 1	239	9	TI-FRM10

SEMIVOLATILE METHOD BLANK SUMMARY

Job No.:

Client: Attn: Address: Work Order No.:

Lab Sample No.: 04-16 Lab File ID: 66065

Matrix: So,)
Level (low/med):

Date Analyzed: //-2-88

Time Analyzed:07:11

Instrument ID: Date Reported:

Project: Duluth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID	Date of Analysis
4NGB-2- MW37-555	88081887 Rex	56342	11-2-88
-2- IFWM -C-	88081939 Kex 1	50262	11-21-83
-2.Mw41-553	88081941 Kex 1	E605k	//-/-88
-2-MP41 - 552	88081942 Rex	E6062	11-2-88
-3-55-AI	88081955 Rex 1	E6057	11-1-88
-3-Ss-CO	88081956 Rex	E 6058	11-2-88
-3-MW25-351-0-1	88092146 Rex	E6059	11-2-88
-3-Mw25-550 2-3	88092147 Cx1	E6060	11-2.88
-3-MW25.553 14-15	83092148 Rex 1	E6061	11-2.88
-			

_
7
52
0
8
\Box
\geq
유
<u> </u>
<
٨
88
~

٠	to and Emiliada	edelbid pad	**************************************	the best sound	More Manager	OHATTY CONTDOI DECITE CHAMADY	electron pathoustrain	t correct their	#50phmab3353	Collisional xs.	A UNITED STREET	1
						COLLII CONIROL RESULIS SURMARI ENVIRONMENTAL QUALITY PARAMETERS PETROLEUM HYDROCARBONS						
ORC		OR001				QC Report No:	No:	TPH-S-	TPH-S-0047-38			
						Sample Matrix:	ıtrix:	Soil				
ద		ES Oak Ridge	U dge			Conc. Unit:	it:	mg/KG			•	
20		ll Hay	'den			Date Received:	ived:	8-18-88	38			
7	7) S. I	[1]inois	710 S. Illinois Avenue	a 1	Date Prepared:	ared:	9-14-88	. <u>8</u>			
Ś	ᇽ	Suite F-103	-103			Date Analyzed:	.yzed:	9-14-88	38			
0	ak	c Ridg	Oak Ridge, In.	37830	0	Date Reported:	rted:	9-21-88	· &			
						Dilution Factor:	Factor:	7				
Д	ď	Duluth ANGB	NGB			%Moisture:	: :	13.1				
						Laboratory	Laboratory Supervisor Approval:	or Appr	oval:			
or Lab	2 8 8	rator) 181943 182099	lboratory Sample N 88081943-88081959 88082099-88082101	QC Report for Laboratory Sample No(s): 88081943-88081959 88082099-88082101	••	ONNO	Butter	: /				
,	į	1	1	•								

Charles and Charles

क्ष्मितिक कर्

the ship the s

Badabilidibu 🕏

Spirital Spirita

Notes	*
RPD	0
PR	70
MSD .	805
PR	70
MS	805
SA	1150
SR	<100
Blank	<100
Anal Method	418.1
Laboratory Sample No.	88031947

If % moisture is reported, results are presented on a dry-weight basis. Percent recovery (PR) and relative percent difference (RPD) are within ES Laboratory control limits. NOTE: *

2401

MS = Spike Sample	MSD = Spike Duplicate
X 100	
×	
MS - MSD	(MS + MSD)/2
H	
(RPD)	
cent Difference (RPD)	
Percent	
Relative I	

Percent Recovery (PR) =
$$\frac{SSR - SR}{SA} \times 100$$
 SR = Sample Res

ENVIRONMENTAL QUALITY PARAMETERS QUALITY CONTROL RESULTS SUMMARY PETROLEUM HYDROCARBONS

TPH-S-0047-88B

OR001 Job No.:

ES Oak Ridge Client: Attn:

Bill Hayden

710 S. Illinois Avenue

Address:

Suite F-103

37830 Oak Ridge, In.

Duluth ANGB Project: QC Report for Laboratory Sample No(s):

88081947-88081959, 88082099-88082101

Laboratory Supervisor Approval:

11-15-88

Dilution Factor:

%Moisture:

9-14-88 9-14-88

Date Prepared: Date Analyzed: Date Reported:

Date Received:

Conc. Unit:

mg/KG Soil

Sample Matrix:

QC Report No:

W

	PR	
	MSD	
	PR	
	MS	
 ٠	SA	
	SR	
	Blank	
, Anal	Method	
Laboratory	Sample No.	

<100 418.1

Blank

1000 **.** <100 ∵

900

90

850

85

9

Notes

RPD

2402

If % moisture is reported, results are presented on a dry-weight basis. NOTE:

Relative Percent Difference (RPD)

x 100 $\frac{MS - MSD}{(MS + HSD)/2}$

MSD = Spike Duplicate MS = Spike Sample

NA = Not Applicable NC = Not Calculated ND = Not Detected

Percent Recovery (PR) = SSR - SR x 100

SR = Sample Result

SA = Spike Added (Concentration)

GC/MS TUNING AND MASS CALIBRATION

Decafluorotriphenylphosphine (DFTPP)

Case No. 123456

Contractor Engineering Scien Contract No. 99999999

Instrument ID #1

Date / Time 10/17/88 13:17

Lab ID >T2017::01

Data Release Authorized By:

m/z	1	ION ABUNDANCE CRITERIA	*RELATIVE	ABUNDANCE
51	-1- 	30.0 - 60.02 of mass 198	46.38 OK	
68	1	less than 2.0% of mass 69	0.00 DK	(0.00) #1
69	ĺ	mass 69 relative abundance	55.72	
70	1	iess than 2.0% of mass 69	0.00 DK	(0.00) #1
127	ı	40.0 ~ 60.0% of mass 198	44.36 OK	
197	i	less than 1.0% of mass 198	0.00 DK	
198	İ	base peak, 100% relative abundance	100.00 OK	
	-	5.0 - 9.0% of mass 198	7.02 OK	
275	i	10.0 - 30.0% of mass 198	16.35 OK	
365	i	greater than 1.00% of mass 198	1.65 OK	
	-	present, but less than mass 443	6.83 OK	
	•	greater than 40.0% of mass 198	45.78 OK	
	-	17.0 - 23.0% of mass 442	8.38 DK	(18.30) #2

vitral calibration

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

\$1 - Value in parenthesis is % mass 69.

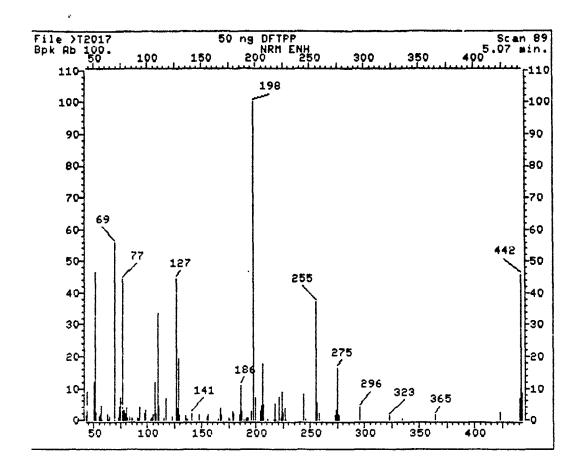
#2 - Value in parenthesis is % mass 442,

SAMPLE ID	LAB_ID		TIME_OF_ANALYSIS
50 ng DFTPP (>	T2017	10/17/88	
SSTD060	50188		(3:33
8808 1948	50189		15:04
8808 1949	50190		(6:04
88081951	50191		17:03
	50182		18:07
88081954	50193		19:04
8808 1957	50194		20:03
88081958	50195		21:02
8808 1959	50196		99:02
8808 1944	50197		23:00-
85081981 5 ml	50198	10/18/88	60:02

lanother project

FORM V

7/85



	Int.				Int.		Int.	m/2	
	1.545						. 682		
44.10	9.016	83.10	1.018	130.15	1.881	193.05	. 836	246.10	.527
50.10	11.942	85.10	. 645	135.25	1.336	196.20	2.708	255.10	37.181
51.10	46.378	86.00	. 373	136.15	.354	198.10	100.000	256.10	5.617
52.10	2.290	91.10	4845	137.15	. 345	199.10	7.016	258.10	2.208
55.10	1.191	92.10	.409	141.05	2.118	204.20	2.808	273.00	1.336
56.00	1.681	93.10	4.144	148.05	1.654	205.10	4.635	274.15	2.963
57.10	4.426	98.10	2.145	155.15	1.145	206.20	17.768	275.15	16.350
58.00	.236	99.10	3.245	156.15	1.609	207.20	4.744	276.25	1.827
63.10	1.754	103.10	, 327	166.05	. 264	210.70	. 282	277.25	1.372
64.00	.200	104.00	.900	167.05	3.690	211.20	.409	296.15	3.981
65.10	1.209	105.10	1.854	168.05	1.918	216.10	.236	323.15	1.336
69.10		107.10				217.10	5.080	334.15	
							.254		
74.10		110.10			2.699			372.00	
75.10			4.490			223.20		372.20	. 209
77.10			.709			224.20		423.20	
78.20			6.862			225.20		441.25	6.825
79.10					2.899			442.25	
80.10		127.15					.227		
81.10					.336		,		2.700

89 Retn. time: 5.07

131a: >T2017 Scan #:

Case No:	Calibration Date: 10/17/88				
Contractor: ENGINEER ING - SCIENCE	Tine: 13:33				
Contract No:	Laboratory ID: >SD188				
Instrument ID:	Initial Calibration Date: 10/25/88				

Minimum RF for SPCC 1s

Maximum I Diff for CCC is I

Conpound	RF	RF	XDiff	CCC	SPCC
Phenanthrene	1.03431	1.02797	.61		
Anthracene	1.05155	1.03155	1.90		
Di-n-Butylphthalate	1.51956	1.42895	5.96		
4,4'-Dibronobiphenyl	-	•	•		
Fluoranthene	1.1904?	1.08936	8.49	#	
Heptachlor Epoxide	-	•	-		
Endosulfan I	-	-	-		
4,4'-DDE	-	-	-		
Dieldrin	•	•	-		
Endrin	-	-	-		
4,4'-000	-	•	•		
Endosulfan II	•	•	-		
Endrin Aldehyde	-	-	•		
4,4'-001	-	-	-		
Endosulfan Sulfate	-	-	-		
Dibutylchlorendate	-	-	-		
Benzidine	.04023	.14520	260.92		
Pyrene	1.56086	1.62823	4.32		
lerphenyl-d14	1.05835	1.18733	12.19		
Butylbenzylphthalate	1.03390	1.05952	2.49		
3,3'-Dichlorobenzidine	.13689	.19172	40.05		
Chrysene	.99655	1.00631	.98		
Benzo(a)Anthracene	1.10407	1.12402	1.91		
bis(2-Ethylhexyl)Phthalate	1.21073	1.29163	6,68		
Di-n-octylphthalate	3.40275	3.59029	5.51	*	
Benzo(a)Pyrene	1.32098	1.32559	.35	*	
Benzo(b)Fluoranthene		1.62646	1.12		
Indeno(1,2,3-cd)Pyrene	.96800	1.02245	5.€3		
Dibenzo(a,h)Anthracene	.87481	.92802			
Benzo(k)fluoranthene	1.44370	1.38522	4.05		
Benzo(g,h,1)Perylene	.89761	.96086	7.05		

RF - Response factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form UI

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:	Calibration Date: 10/17/88					
Contractor: Emblacering-Science	Tine: 13:33					
Contract No:	Laboratory ID: >S0188					
Instrument ID:	Initial Calibration Date: 10/2/88					

Minimum RF for SPCC 15

Maximum I Biff for CCC is I

	_				
Conpound	RF	RF	201ff	acc	SPCO
N-Nitroso-Dinethylanine	.90169	.91800	1.81		
2-Fluorophenol		1.20899			
bis(2-Chloroethyl)ether	1.11892	1.00464	10.21		
Phenol		1.37283		*	
Phenal-d5	1.22488	1.15952	5.34		
Aniline	.54193	. 80303	48.18		
2-Chlorophenol		1.29182			
1,3-Dichlorobenzene	1,47535	1.45381	1.46		
1,4-Dichlorobenzene	1.40530	1.30635	7.84	*	
Benzyl Chloride	-	-	•		
Benzyl filcohol	.72906	.42225	42.08		
1,2-Dichlorobenzene	1.32240	1.36614	3.31		
2-Hethylphenol	1.17367	1,41431	20.50		
3-4-4-Hethylphenol		1.365?8			
bis(2-chloroisopropyl)Ether	2.15627	2,40398	11.49		
H-Hitroso-Di-n-Propylamine		.75529			**
Hexachloroethane	.53940	.53690	.30		
Dibranochloropropane	•	-	•		
Ni trobenzene	.40312	.40415	. 26		
Nitrobenzene-dS		.40160			
2-Hitrophenol	.24657				
Isophorone		,79627			
bis(2-Chloroethoxy)methane		.52047			
2,4-Dimethylphenol		,385%			
Benzoic Acid		.28579			
2,4-Dichlorophenol	.56733				
1,2,4-Trichlorobenzene	.36913				
Naphthalene	.94589				
1-Chlorganiline	.36309		13.58		
Hexachlorobutadiene	.20283				
f-Chloro-3-Hethylphenol	.31360				
2-Methylnaphthalene	.56397			-	

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

XD:ff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:	Calibration Date: 18/17/88			
Contractor: ENDINGERING - SCIENCE	Tine: 13:33			
Contract No:	Laboratory ID: >S0188			
Instrument ID: 1	Initial Calibration Date: 10/1/88			
Minimum RF for SPCC is	Maximum I Biff for CCC is I			

Compound	R.	R F	XD iff	CCC	SPCC
Hexachlorocyclopentadiene	.29568	.41690	41.00		**
2,4,6-Trichlorophenol	.42280	.43897	3.82		
2,4,5-Trichlorophenol	.52897	.53766	1.64		
2-Fluorobiphenyl	1.27220	1.17968	7.27		
2-Chloronaphthalene	1.23784	1.23445	.27		
2-Hilroeniline	.47288	.48294	2.13		
Dinethylphthalate	1.49629	1.32200	5.99		
2,6-Dinitrotoluene	.37415	.36761	1.75		
Roenaphthylene	1.68918	1.65303	2.14		
3-Mitroaniline	.4455?	.46208	3.71		
2,4-Oinitrophenol	.11898	.10414	12.47		**
Acenaphthene	1.13011	1.06521	5.74	*	
Dibenzofuran	1.64131	1.57585	3.99		
2,4-Dinitrotoluene	.29418	.27073	4.73		
4-Hitrophenel	. 28450	.31643	11.23		**
Fluorene	1.12850	1.02990	8.74		
Diethylphthalate	1.20939	1.04745	13.39		
4-Chlorophenyl-phenylether	.59183	. 58947	.48		
1-Hitroaniline	.35956	.38920	8.24		
2,4,6-Trabronophenol		. 2225!	5,84		
1,2-Diphenylhydrazine	•	-	-		
Alpha-BHC		•			
Beta-EHC	-	-	-		
Garvia-BUC	-	-			
Delta-BHC	•	-	-		
Heptachlor	-	-	-		
Aldrin	-	-	-		
H-Hitrosodiphenylanine	.40286	. 17132	17.74		
1,6-Dinitro-2-Methylphenol	.10514	-	•		
1-Bronophenyl-phenylether		.23327	9.51		
Kexachlorobenzene	. 26273		10.08		
Pentachlorophenol	.14536		6.02		

RF - Response Factor from daily standard file at 60.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab	Name:	Engineer	ng Science		Contract:	ORØØ	1	•
		:			SAS No.:		Job No.:	
	Sample No. (Standard): 59TDØ6Ø				•	Date A	malyzed: 10	11/88
Lab	File	ID (Standar	:d): So	0188		Time A	.nalyzed:	13:33
Inst	rumer	nt ID: \						
,	, ,		IS1(DCB)		IS2 (NPT)	l 1	IS3 (ANT)	······································
			AREA #	•	AREA #	. ,	AREA #	RT
		12 HOUR	49974	9.25	167861	12.88	92426	18.35
		UPPER LIMIT	99948	9.75	335722	13.38	184852	18.85
		LOWER LIMIT					46213	1
		EPA SAMPLE NO.						
۶۰	90 02 91 03	8808:1948 8808:1949 8808:1949	37763 37385 46478	9,17 9,07 9,05	92557 89491 160696	(7.83 12.65 12.83	67128 39748** 854661	18.32 18.31 16.33
	93 05 44 06	8808 1952 8808 1954 8808 1957	46682 44327	9.26	163135 166571 147376	12.83 (2.83 (2.84	90749 86456 77745	18.33 18.33 18.33
	97 35	! 8808 1958 ! 8808 1959 ! 8808 1994 ! 8808 1981 5 = 2	33538 37412 45251 71140	9.16 9.18 9.25 9.29	15683	12.84	74892 8685 77762 154518	18.33 18.34 18.32
	12				7400			
	14 15							
	17 18 19							
	20 21 22							
]	IS1 (1 IS2 (1	OCB) = 1,4-1 NPT) = Naph ANT) = Acena	thalene-13	nzena-d	i: L	OWER LIN	standard a	raa.
į	# Col	umn used to	flaç inte:	rnal sta			D G M M M M M M M M M M	

FORM: 7222 57-1

10/3

page __ of __

\$,	-	ATILE INTE	•	•			
Lab Name:	Enginee	nng Scie	nce.	Contract:	ord	<u> </u>	•
Lab Code:		Case No.:	•	SAS NO.:		. JOB HO.	. -, -,
Iqms2	e No. (Stand	lard): 557	D664		Date A	nalyzed: _(0/17/
Lab File	ID (Standar	cd): <u>S</u> (2188	-	Time A	malyzed:	13:3
Instrumen	nt ID:			•			
		IS4(PHN) AREA #	•	IS5(CRY) AREA #		IS4(PRY) AREA #	RT
	12 HOUR	146770	20.99	92741	31.44	53292	37.51
	UPPER LIMIT_	293540	23,49	185482	31.94	106584	38.0
	•	73385	22.49	46371	30,94	26646	37.0
	EPA SA1PLE NO.	•					****
	808-1948	119515	82.97	· ————	31,41	23880*	
	18808. 1949 18808 1951	133754	22.97	1 <u>62196</u> 169576	31.42	20126 X	37.4
92 04	8808 1452	136889	22-98	76272	31,42.	221014	37,4,
	8808 1954	1 127574	<u> </u>		31.41		1 <u>37.4</u> 1 37.5
95 07	861× 19 cx	129977	1 22.99	75474	31,43	25987*	37.5
90 0 = 97 0 =	808 1959 8808 1944	159963	<u> 82.98</u>	24267*	31.42	13376# 2677*	37.5. 17.5
97 C∓ 98 ± :	8808 1981 546	226890	83.01	104455	31.46	62857	7.5
11	i	— — — —		<u> </u>	i	'	
	•				!		
<u>:</u> - 1 =			ļ				;
is							
	*	· 	·	.			:
			:				
- w	,	-	·	-	·	.	
20			1	l)	1
IS4 : IS3 (anchrene-d sene-dl2	TTO.		f inter	• = -	03 ಶಕ್ಷತಾ
:	73.1 = Peri	leme-dl2	•	·	OWER LI	MIT = - EC	
# c al	umn used to	o flag inte	ernal st			mal standa s with an	
, page	c:		•	•		•	
			46.9	9 ^{VIII} SV-2		•	

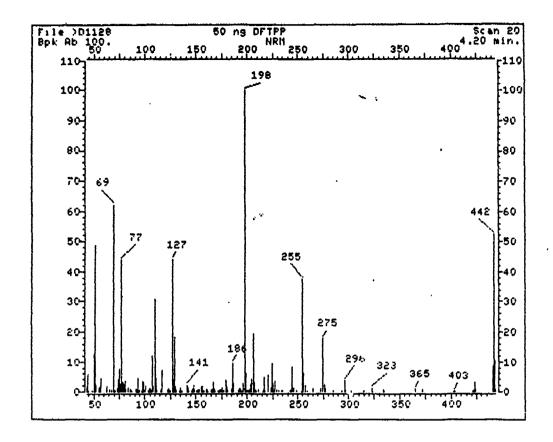
10/36

SEMINOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

,	LÁB .	i LAB	DATE	TIME	1
į	SAMPLE ID	! FILE ID	: ANALYZED	ANALYZED	
.	*************************		*******		
	80 ug/ml BNA STD	>E6326	1 11/28/88		i .aa
	88081972 Iml REANAL.	: >E6327	1 11/28/88		Is out , use
03:		: >E6328	1 11/28/88		IIS out ignitured
	88081948 1ml REANAL.	i, >E6329	1 11/28/88	17:37	IIS out and mud
05	88081949 1ml REANAL.	>E6330	11/28/88	18:32	IIS out I don't per!
0 51	88081951 Iml REANAL.	! >E6331	1 11/28/88	19:27	we ,
07	88081952 Iml REANAL.	! >E6332	1 11/28/88	20:22	IN 0 14 contract
08	88081959 1ml REANAL.	! >E6333	1 11/28/88	1 21:17	I Lot dont nect
09	88081973 1ml REANAL.	! >E6334	1 11/28/88	22:12	Thout we
.1 10	88081977 Iml REANAL.	: >E6335	1 11/28/88	23:06	TTOOUT TOOKTHEE
another 1	88082149 1ml REANAL.	! >E6336	1 11/29/88	0:01	1550JT
might [12]	88082296 REX REANAL.	! >E6337	1 11/29/88		itsout,
() 131		>E6338	1 11/29/88	1:50	155 out dontraid
14		l	l	l	1
15		l	·	l	:
161	· · · · · · · · · · · · · · · · · · ·	l		l <u></u>	1
17	'	1	l	<u></u>	:
181	·	I	!	l	1
19	l <u></u> l	!	l	l	1
20		<u> </u>	!	l	!
21		I	I	l	1
22		مـــــــــــــــــــــــــــــــــــــ		!	•
page 1 d	of 1	i de	\$ <u>1 (1</u>		

FORM V SV

1/87 Rev.



File: 201128 Scan #: 20 Retn. time: 4.20

35. 13. 12.15. 用限的基本

n/z	int.	n/Z	int.	H/Z	int.	MZ	int.	M/Z	int.	
43.10	1.808			149.00			.212	254.95	37.481	
44.00	5.903	98.05	3.347	151.10	.537	196.05	2.867	255.95	6.030	
44.90	. 395	99.05	3.192	151.80	. 282	197.90	100.000	257.05	.410	
1 8.90	.551	99.95	. 325	152.30	.184	198.90	6.200	257.95	1,991	
50.00	12.484	100.95	1.963	153.00	.706	199.90	.424	258.95	.311	
51.00	48.807	102.95	.537	153.95	.720	200.90	. 268	264.95	1.003	
52.00	2.528	103.95	. 974	155.05	1.652	201.50	.508	272.85	1.102	
55.10	1.582	105.05	1.158	156.05	1.921	202.90	.607	274.05	2.570	
56.00	1.822	106.05	. 138	157.05	.551	201.00	2.514	274.95	17.907	
57.00	4.576	107.05	11.877	157.95	. 395	204.90	4.138	275.95	2.316	
63.00	1.864	108.05	1.737	159.95	.607	206.00	19.333	276.95	1,215	
65.10	.847	110.00	30,843	160.95	.805	207.00	3.276	285.00	.311	
67.05	.650	111.90	4.378	161.85	.226	208.00	. 890	293.00	. 395	
68.95	62.039	112.00	.593	164.95	.734	209.00	.410	295.90	3,771	
69.95	.282	116.00	.706	166.05	.664	211.00	. 833	296.90	.664	
71.05	.551	117.00	7.100	167.05	3.234	215.90	.367	303.00	.466	
73.05	.946	121.90	.621	168.05	1.257	216.90	4.943	314.10	. 254	
73. 9 5	4 081	123.00	1.186	168.95	.311	218.00	.523	315.00	.494	
74.95	7.584	123.90	.551	171.05	. 325	221.00	5.352	323.00	1.144	
76.05	2.471	125.00	,500	171.95	. 339	223.00	1,299	323.90	. 240	
77.DS	43.906	127.00	44.160	172.95		224.00		333.95	.720	
70.05	3.050	128.00	3.502	173.95	.692	225.00	2.839	334.95	. 381	
78.95	3.079	129.00	18,430	175.75	1.469	226.10	. 268	364.85	1.017	
79.95	2.302	130.00	1.638	176.15	.494	227.00	3.629	<i>3</i> 72.00	.692	
80.9 5	3.615	131.00	.607	176.95	.748	229.00	.729	102.00	.212	

```
31.75
       נט.רנו זרם,
                     .331 1(0.33 3.030 431,10
                                                  . 3/3 101, 70
B3.05 1.469 134.90
                    1.271 180.05
                                  1.850 233.90
                                                  .325 404.00
                                                               .198
83.95
        .297 135.90
                      .466 181.05
                                   .861 235.00
                                                               .297
                                                  .339 421.05
                      .537 185.05
85.05
        .692 136.90
                                  1.200 241.95
                                                  .452 421.95
                                                               .410
86.05
        .706 137.90
                     .169 186.05 9.688 243.05
                                                  .523 422.95
                                                             3,135
87.05
       .551 141.00
                     2.260 187.05
                                  2.895 243.95
                                                               .621
                                                8.064 423.95
                     1.497 191.25
91.05 1.059 142.00
                                                              8.389
                                   .410 244.95
                                                1.073 441.05
91.95
        .918 143.00
                     .508 191.95 1.003 245.95
                                                1.299 442.05 52.436
92.95 4.590 146.00
                     .353 193.05
                                  1.045 248.85
                                                 .325 443.05 10.691
93.95
        .353 147.00 1.102 194.05
                                    .282 253.95
                                                 .198 444.05
                                                               .847
        .692 148.00 2.005 194.95
95.05
                                    .226
```

Case No:		Calibration Date: 11/28/88					
Contractor:		line:		••		•	
Contract No:			itory ID		-		
Instrument IO:		Initia	l Calib	ration	Date: 10/13/88		
Minimum RF for SPCC is		Maxim	um I Di:	ff for	CCC is I		
Conpound	RF				CC		
K-Hitroso-Dinethylanine	1.24043	.92454			••		
2-Fluorophenol	1.41912	1.22649	13.57				
bis(2-Chloroethyl)ether	1.41737	1.10446	22.08		•		
Phenol	1.78209	1.45324	18.45	#			
Phenol-d5	1.35470						
Aniline	.74553	.45687	38.72				
	1.32089				•		
1,3-Dichlorobenzene	1.51101				7		
1,4-Dichlarobenzene	1.51574	1.47930	2.40	*			
Benzyl Chloride		•	-				
Benzyl Alcohol	.56944						
1,2-Dichlorobenzene	1.45179	1.32928	8.44				
2-Methylphenol	1.42392						
3-4-4-Hethylphenol	1.58422	1.26540	20.12				
bis(2-chloroxsopropyl)Ether	2.35722	2,22626	5,56				
N-Hitroso-Di-n-Propylamine	1.13410	1.07958	4.81		•		
Hexachloroethane	.70056	.66935	4.45				
Dibromochloropropane	-	•	-				
Hitrobenzene	.56683	.47501	16.20				
Mitrobenzene-dS	.49938	. 45185	9.52				
2-Mitrophenol *	.22040	.24467	11.01				
Isophorone	.87207	.80677	7.49				
bis(2-Chloroethoxy)methane	.58240	.54941	5.66				
2,4-Dinethylphenol	.40862	.37099	9.21				
Benzoic Acid	.29595	.33432	12.97				
2,4-Dichlorophenol	.53135	.49861	6.16				
1,2,4-Trichlorobenzene	.31739	. 33435	5.34				
Maphthalene	.98196	. 94582	3.68				
4-Chloroaniline	.33116	. 25863	21.90				
Kexachlorobutadzene	.18652	.18717	.35				
4-Chloro-3-Hethylphenol	. 20631	. 27505	3.93	*			
2-Methylnaphthalene	.54468	.54243	.41				

RF - Response Factor from daily standard file at 80.00 mg/L

RF - Average Response Factor from Initial Calibration Form UI

IDiff - I Difference from original average or curve

CCC - Calibration Check Congounds (*) SPCC - System Performance Check Congounds (**)

Case Nó:	Calibration Date: 11/28/88							
Contractor:		Tine:	Time: 14:37					
Contract No:			Laboratory IO: >E6326					
Instrument ID:		Initia	ıl Calibo		on Date: 10/13/88			
Minimum RF for SPCC is		Haxir	Maximum I Diff for CCC is I					
Corpound	RF	RF	Moiff	CCC	SPCC			
Hexachlorocyclopentadiene	.33289	.34672	4.15		**			
	.32295	.35809	10.88	*				
2,4,5-Trichlorophenol	.49539				•			
* * *	1.26699							
	1.24653							
2-Hitroaniline	.63129							
	1.33033				•			
-	.31816				•			
• •	1.65820							
	.63702							
•	.05753				##			
Acenaphthene	1.12644			Ħ				
Oibenzofuran	1.50204							
2,4-Dinitrotaluene	.32099							
1-Nitrophenol	.18425				#h			
fluorene	1.09332							
Diethylphthalate	1.32354							
4-Chlorophenyl-phenylether	.48214							
4-Kitroaniline		.25839						
2,4,6-Tribromophenol	.14218	.19147						
1,2-Oliphenylhydrazine	-	-	•					
Alpha-BHC	•	•	•					
Bela-BHC C	•	•	•					
Garma-8HC Del ta-8HC	•	•	-					
verta-enr Heptachlor	•	-	-					
neptacnior Aldrin	•	-	-					
ncorin K-Hitrosodiphenylanine	.44983	.42786	4.88					
1,6-Dinitro-2-Kethylphenol	.08606	. 16(00	7,00	-				
1-Bronophenyl-phenylether	. 22979	.23871	3.89					
Hevachlorobenzene	.28768							
Pentachlorophenol		.14106						

RF - Response Factor from daily standard file at 80.00 mg/L

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

RF - Average Response Factor from Initial Calibration Form VI

ID:ff - I Difference from original average or curve

POSSESSEDANS

granistating,

Case No:			Calibration Date: 11/28/88				
Contractor:			Tine: 14:3?				
Contract No:		Labora		:)[6326			
Instrument ID:		Initia	ıl Calib	ration Date: 10/13/88			
Minimum RF for SPCC is		Maxim	wan X Di	ff for CCC is I			
Compound RF				CCC SPCC			
	1.07960						
Anthracene	1.13334	1.08940	3.88				
Di-n-Butylphthalate	1.71746	1.76704	2.89				
4,4°-Dibromobiphenyl		•	•				
fluoranthene	1.17568	1.14406	2.69	*			
Heptachlor Epoxide	-	-	-				
Endosulfan I	•	•	-				
4,4'-DDE	-	-	-	·			
Dieldrin	•	-	-				
Endrin	-	-	•				
4,4'-000	-	-	•				
Endosulfan II	-	-	-				
Endrin Aldehyde	-	-	•				
4,4*-001	-	-	•				
Endosulfan Sulfate	-	•	•				
Dibutylchlorendate	•	•	•				
Benzidine	.03775	.01283	66.01				
Pyrene	1.65647	1.58486	1.32				
Terphenyl-d14	1.09647	1.16861	6.58				
Butylbenzylphthalate	1.15097	1.25646	9.17				
3,3'-Orchlorobenzidine		.15939					
Chrysene		1.02999					
Benzo(a)Anthracene		1.08107					
	4 94949		48.40				

1,34247 1.57201

3.72331 4.11352

1.27071 1.22611

1,48902 1.63869

.82543 .99849

.78966 .88462

1.51900 1.25388

.74580 .92269

17,10

10.05

20.97

12.03

17.45

10.48 *

3.51 #

bis(2-Ethylhexyl)Phthalate

Di-n-octylphthalate

Benzo(b)Fluoranthene

Indeno(1,2,3-cd)Pyrene

Oibenzo(a,h)Anthracene

Benzo(k)Fluoranthene

Benzo(g,h,i)Pcrylene

Benzo(a)Pyrene

RF - Response Factor from daily standard file at 80.00 mg/L

RF - Ruerage Response Factor from Initial Calibration Form UI

ID:ff - I difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

88 SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: Engineering Science	Contract:
Lab Code: Case No.:	_ SAS No.: SDG No.:
Lab File ID (Standard): >E6326	Date Analyzed:11/28/88
Instrument ID: 70 2	Time Analyzed: 14:37

			જ				
		IS1(DCB)				IS3(ANT)	
!=:		AREA #		AREA #		AREA #	
1	12 HOUR STD	50805.	7.83	181471.	11.33	98950.	16.691
1 (upper Limit:	101610.		362942.		197900.	1
1 1	LOWER LIMIT	25403.		90735.		49475.	·
1 1	SAMPLE NO.			,			!
01 89 02 86 03 88 04 89 05 88 06 88 07 88 09 88 10 88 11 88 12 88 11 88 12 88 11 88 12 88 14 — 15 — 16 — 17 — 18 — 1	8081972 1ml; 8081943 1ml; 8081949 1ml; 8081951 1ml; 8081952 1ml; 8081959 1ml; 8081973 1ml; 8081977 1ml; 8082149 1ml; 8082296 REX; 80821976 1ml;	57255. 47262. 30072. 31680. 46872. 50647. 51205. 54596. 58488. 96062. 41838. 50940.	7.82 7.83 7.81 7.80 7.83 7.84 7.83 7.82 7.83 7.83 7.83	196138. 164123. 123881. 122956. 169963. 179988. 194858. 198601. 205372. 346968. 160809. 189486.	11.27 11.27 11.27 11.27 11.29 11.28 11.29 11.27 11.27 11.27 11.29	108517. 85734. 71845. 80267. 91053. 96705. 108546. 103998. 109181. 189232.	15.65! 16.66! 16.66! 16.66! 16.66! 16.67! 16.65! 16.69! 16.65!

```
ISi (DCB) = 1,4-Dichlorobenzene-d4
```

UPPER LIMIT = + 100%

IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d8

of internal stansard area.

LOWER LIMIT = - 50%

of internal standard area.

Column used to flag internal standard area values with an asterist

page 1 of 1

8C SEMIUOLATILE INTERNAL STANDARD AREA SUMMARY

Lab	Name:Engineeri	ing Sci	ence	Contract:	······································	.•	
Lab	Code: ES01	Case	No.:	SAS No.:		SDG No.:	 ·
Lab	File ID (Stand	iard):	>E6326	•	Date	Analyzed:11/2	28/88
Ins	trument ID:	70	2		Time	Analyzed: 14	: 37

•		 			······································	·
1	IS4(PHN)		ISS(CRY)		IS3(PRY)	
	AREA #		AREA #		I AREA #1	• • •
*****	•	-	*	•	•	
1 12 HOUR STD	145426.		•,			34.48
: UPPER LIMIT!	290852.		196094.	,		*****
! UPPER LIMIT		•			127136.	
LOWER LIMIT!	,	•	49024.		31784. 1	

: EPA SAMPLE			•,			
1 NO. 1						
*****	=========		22222222			
1:88081972 1ml:	162435.	21.24	1 107916.	29.62	21087.*	34.45
2188081943 lml:	119695.	21.24	79499.	29,61	11045.*!	34.49
4:88061951 1ml!	138789.	21.26	89214.	29.63	38143.	34.48
5188081952 1ml:		21.25		29.63	31571.*1	34.44
5:88081959 1ml:	· · · · · · · · · · · · · · · · · · ·	21.26	113021.	29,63	30206.*!	34.48
7:88021973 1ml:						
3188081977 ml						
3188082149 1ml:						
0188082296 REXI		21.26				
:88081976 ml:	169679.	21.26	114187.	29.64	34940.	54.49
?		·			<u> </u>	
88081948	726/13	21.25	27/10	29 62	19466 4	34.00
148081949	126726	21.25	29427	29.63	280/4	34.42
61 1	122100			<u> </u>		
31						
)						
):!						
211						

```
IS4 (PHN) = Phenanthrene-d10
```

* Column used to flag internal standard area values with an asterisk

page 1 of 1

03:

ISS (CRY) = Chrysene-d12

ISG (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal stansard area.

LOWER LIMIT = - 50%

of internal standard area.

SÉMÍVOLATILE ORGANÍC GG/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: Engineering Science	Contract:
2	SÁS No.:
Lab File ID: >D1129	DFTPP Injection Date: 11/29/88
Înstrument ÎD: 70 2	DFTPP Injéction Time: 10:40
m/e ION ABUNDANCE CRITERIA	RELATIVE ABUNDANCE
51 30.0 - 60.0% of mass 198	50.0 0.0(0.0 65. .6(.9 43.4 0.0 undance 100.
275 10.0 - 30.0% of mass 198 365 Greater than 1.00% of mass 441 Présent, but less than mass	198 1.72 0

1-Value is % mass 69

443 : 17.0 - 23.0% of mass 442__

442 Greater than 40,0% of mass 198_____

2-Value is % mass 442

94.0

16.7(17.8)

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS

Í	LAB	LAB	DATE	TIME
	SAMPLE ID	· FILE ID	ANALYZED	ANALYZED
	80MG/L ABN STD .	>E6339	11/29/88	10:59
the posetoe:	88082998 REANALYSIS.	>E6340	1 11/29/88	12:21
of reeded 031	88082783 RÉANALYSIS.	>E6341	11/29/88	13:16
نيو X	- SSUCETES REAMALYSIS.	>E6361	11/29/88	13:16
natreeded (15)	88:32672 1ml REANAL.	>E6343	11/29/88	15:24
v 061	83092673 1ml REANAL.	>E6344	11/29/88	16:19
v 07!	88081953 1ml REANAL.) >E6345	1 11/29/88	17:14
. 081	88081954 1ml REANAL.	>E6346	11/29/88	18:09
► Ó9 j	88081957 1ml RÉANAL.) >E6347	11/29/88	19:04
V 10	88081958 1ml REANAL.) >E6348	1 11/29/88	19:59
int needed 11.	88092674 1ml REANAL.) >E6349	11/29/88	20:54
" 12	88092674 MS REANAL.	>E6350	11/29/88	21:48
v 13;	88092674 MSD REANAL.) >E6351	11/29/88	22:43
14				İ
15!				
16	-			
17				
18	The state of the s			
19	A 7			
ຂໍ້ບໍ <i>່</i> :	The state of the s			
21				
2.5	The second of th		- (*	

FORM V SV

1/87 Rev

10 350

GC/NS PERFORMANCE STANDARD

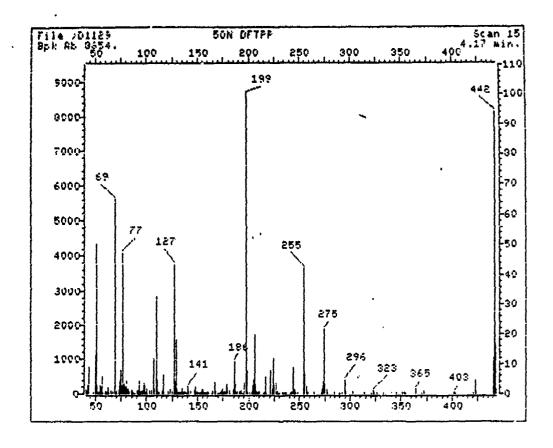
Décéfluorotriphenylphospine (DFTPP)

Š.		% Řelative Abundance				
** } .	Ion Abundance	Base	Appropriate			
M/z	Criteria	Peak	Peak	Status		
SI	30-60% of mass 198	50.03	50.03	Ok		
63	Less than 2% of mass 69	0.00	0.00	Ok		
83	(reference only)	64.80	84.30	Ok		
70	Less than 2% of mass 69	.58	.89	Ok		
127	40-50% of mass 198	43.37	43.37	Ok		
197	Less than 1% of mass 198	0.00	0.00	Ok		
138	Base peak, 100% relative abundance	100.00	100.00	0k		
139	5-9% of mass 198	7.41	7.41	Ok		
	10-30% of mass 198	21.68	21.83	Ok		
385	Greater than 1% of mass 138	1.72	1.72	Ok		
441	0-100% of mass 443	11.37	71.50	Ok		
442	Greater than 40% of mass 198	94.04	94.04	Ok		
443	17-23% of mass 442	18.72	17.78	0k		

Injection Date: 11/29/88 Injection Time: 10:40 Data File: >D1123

Scan: 15

A 454-2-1



Fale: 201123 Scan #: 15 Retn. time: 4.17

n/I	lat.	n/2	Int.	ħ/Z	lāt.	n/z	Int.	n/z	Int.
11.00	1,479	ac ac	חרם	150.10	٠٠٠٠٠	100 00	451	771 95	.196
				151.90		201.40		272.85	1.491
12.00	. 350	95.95							
43.18	2.750	97.85		152.00		202.90		273.95	3.779
11.00	9.771	97.95		152.30		203, 90		271.35	21.678
13.90	. 335			153.95		201.80		275.85	3.039
50.00	12.001			151.95		205.90		276.95	
51.00		100.95		155.95		206.90		277.85	
52.00		101.95		156.95		207.30		284.00	
53.CO		103.05		157.75		209.90		289.90	.116
54.00		103.95	1.132	158.95	. 416	210.30	.578	290.80	.173
35.00	2,785	104.95	1.121	159.35	.555	210.90	.844	292.80	. 439
56.00	2.022	106.95	11.555	160.95	. 901	215.00	.162	235.00	1.531
57.00	5.901	107.95	1.710	161.65	.335	215.90	. 370	296.80	.693
50.00	.312	107.90	32, 171	164.25	.196	216.90	5.362	303.00	.624
60.00	. 636	111.00	1.322	161.85	.517	217.90	.520	314.70	.462
61.00	.716	111.90	. 439	166.35	3,002	220.30	7.516	320.90	.220
62,00		112.90		167.85		222.90	1.329	323.00	1.875
63.00		115.90		169.65		223.90		324.00	.312
64.00		116.90		170.85		224.90		326.30	.391
65.00		110.80		171.05		226,90		332.55	.139
66.95		121.90		172.75		227.90	-	333.05	.913
63.95		123,00		173.95		220.90		334.95	.228
70.05		123,90		174.95		229.90		340.85	.266
71.05		125,00		175.05		230, 98		345.05	.335
72.95		126.90		176.15		233.90		351.85	,497
73.95		127.98		176.35		231.00		352.95	. 266
74.95		120.30		177.05		235.90		353.95	
75.95		129.90		170.05		236,90		351.05	.116
76.95		130.90		179.05		237.00		361.05	1,722
10.73	Ti. 170	1 Jy. 70	, TUT	117.03	2,037	LJI,UV	, 315	301.03	1,126

```
. 207 100.75
11.32 3.60m totale
                                                   .579 372.00
                                     .139 241.95
78.95 3.35; 132.90
                      .301 102,05
                      .532 101.95 1.456 242.05
                                                   .520 372,70
79.95
      2.253 133.90
                                                                 .162
00.95 1.229 135.00
                     1.018 185.95 10.780 243.05 0.690 302.80
                                                                 .136
91.95 1.271 136.00
92.95 1.722 136.90
                      .570 106.05
                                  3.062 244.95
                                                 1.401 300.00
                                                                 .127
                      .716 107.95
                                     .335 245.05
                                                 1.540 401.90
                                                                 .324
                                     .774 246.75
                                                   .312 402,90
93.95
       .75: 137.90
                      .277 100.05
                                                                 .433
      1.017 138.90
                      .324 190.95
                                     .520 218.85
                                                   .439 403.80
                                                                 .150
05.05
        .971 139.90
                      .105 191.05
                                    .774 254.05 42.212 420.75
                                                                 .451
05.95
        .500 140.00
                     2.300 192.95
                                    1.063 255.05
                                                 6.443 422.85
07.85
37.35
        .196 141.00
                      .090 193.95
                                    .105 256.95
                                                   .420 423.75
                      .624 195.05
                                    .231 257.05
                                                 2.427 440.95 11.971
33.35
        .173 143.00
                                                   .300 111.85 94.037
                     1.190 195.95 3.420 250.75
90.93
      1.010 116.90
                     2.000 197.00 100.000 250.95
                                                   .300 442.85 16.721
91.35
       .763 147.90
92.95 4.299 148.90
                     .474 190.00 7,407 264.05
                                                   .090 443.95 1.760
       .370
93.95
```

CHRISTONNOS E

Tunnelsmannels

International Property

profession application

PRINTERININGS

Company of the Party of the Par

であれずること

Contractor:	Calibration Date: 11/29/88					
-witter (0)	******	ilne	10:59	••••		·
Contract No:	*****	Labor	ratory II);) <u>[</u>	6339	
Instrument ID:	******	Initi	ial Calii	rati	on Dat	e: 10/13/88
Minimum RF for SPEC :	is	Maxi	nun X Di	tt t	or CCC	is X
Conpound		RF	ZDiff	CCC	SPCÇ	
N-Hitroso-Dinethylamine	1.24043	.68491	44.78			
2-fluorophenol	1.41912	1.13889	19.75			
bis(2-Chloroethyl)ether	1.41737	1.19679	15.56			
Phenol	1.78209					
Phenol-d5	1.35470					
Aniline	.74553					
2-Chlorophenol	1.32089					r
1.3-Dichlorobenzene	1.51101 1					
1,4-Dichlorobenzene	1.51574 1					
Benzyl Chioride	-	-	•			
Benzyl Alcohol	.56944	.74578	30.97			
1,2-Dichlorobenzene	1.45179 1					
2-Methylphenol	1.42392 1					
3-8-4-Methylphenol	1.58422 1	. 32690	16,24			
bis(2-chloroisopropyl)Ether	2.35722 2	.61692	11.02			
M-Nitroso-Di-n-Propylamine	1.13410 1	.19969	5.78		##	
Hexachloroethane	.70056					
Dibronochloropropane	•	•	•			
Kilrobenzene	.56683					
Hitrobenzene-d5	. 49938					
?-Ki trophenol	.22010 .			•		
sophorone	.87207 .					
pis(2-Chloroethoxy)methane	.58240 .		1.86			
4-Dinethylphenol	.40862 .		4.17			
Benzoic Roid	. 29595 .		7.61			
.4-Dichlorophenol	.53)35 .		6,58	¥		
.2.4-Trichlorobenzene	.31739 .		4.76			
aphthalene	.98196 .	95489	2.76			
-Chloroaniline	.33116 .	25983	21.54			
exachlorobutadiene	.18652 .:	18674	.12	ı		
-Chloro-3-Methylphenol	.28631 .:	30794	7.55	ŧ		
-Methylnaphthalene	.54468 .!	57362	5.31			

RF - Response factor from daily standard file at 80.00 ng/L

RF - Ruerage Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

・ 神経のできないというとうというだけ、いっというしていっているというできない。 かいかん

一、イン・・

HISTORY CONTROL

Case Ho:			Calibration Pate: 11/29/88					
Contractor:	Tine:	10:59		,,,,,,,	•			
Contract No:		Labora	tory ID:)E	5339			
Instrument 10:		Initia	l Calib	rati	on Date	: 10/13/88		
Minimum RF for SPEC is		Harin	iun X Di:	if f	or CCC	is X		
Conpound	RF				SPCC			
Hexachlorocyclopentadiene	.33289	.34779			##			
•	. 32295					•		
	. 49539							
2-Fluorobiphenyl	1.26699							
2-Chloronaphthalene	1.24653							
2-Mitroaniline	.63129	.57306	9.22			٠		
Dinethylphthalate	1.33033	1.35476	1.84					
2,6-Dinitrotoluene	.31816							
Acenaphthylene	1,65820							
3-Mitroaniline	.63702	.57198	10.21					
2.4-Dinitrophenol	.05753	.13640	137,11		¥×			
Acenaphthene	1,12644	1.06790	5,20					
Dibenzofuran	1.50204	1.51179	. 65					
2.4-Dinitrotoluene	.32099	. 33359	3.92					
4-Nitrophenol	.18425	. 20303	10.19		**			
Fluorene	1.09332	1.17199	7.20					
Diethylphthalate		1.28109						
4-Chlorophenyl-phenylether	.48214							
4-Mitroaniline	. 27495	. 32401	17.84					
2,4,6-Tribromophenol	.14218	, 16604	16.79					
1,2-Diphenylhydrazine	-	•	•					
Alpha-BHC	•	•	-					
Beta-BHC	•	-	-					
Ganna-BHC	•	•	-					
Delta-BHC	-	•	-					
Heptachlor	•	-	•					
Aldrin	•	-	-					
H-Hitrosodiphenylanine	. 44983	. 12991	4,42					
1.6-Dinitro-2-Hethylphenol	. 08606	•	-					
4-Bronophenyl-phenylether	. 22979	.24975	8.69					
Hexachlorobenzene	. 28768	.31238	8,58					
Pentachlorophenol	.11390	.14168	24.38	Ħ				

RF - Response Factor from daily standard file at - 80.00 mg/L

RF - Average Response Factor from Initial Calibration Form VI

ID:ff - I Difference from original average or curve

CEC - Calibration Check Compounds (*) SPEC - System Performance Check Compounds (**)

Case No:		Calibr	ation D	ate: 11/29/88
Contractor:		Tame:	10:59	
Contract No:		Labora		: >{6339
Instrument ID:		Initia	l Calib	ration Date: 10/13/88
Minimum RF for SPCC is		Maxim	un X Di	ff for CCC is X
Conpound		RF		CCC SPCC
Phenanthrene		.99879		
Anthracene	1.13334	1.12636	.62	•
Dı-n-Butylphthalate	1.71746	1.72420	. 39	
4.4'-Dibromobiphenyl		-	-	
Fluoranthene	1.17568	1.18335	.65	
Heptachlor Cooxide	-	•	-	,
Endosulfan I	-	-	-	·
4,4'-008	-	•	-	
Dieldrin	•	-	-	
Endrin	-	•	•	
4.4'-000	-	-	-	
Endosulfan II	-	•	-	
Endrin Aldehyde	-	-	-	
4,4'-001	-	•	•	
Endosulfan Sulfate	-	•	-	
Dibutylchlorendate	-	-	•	
Benzidine	.03775	.15275	304.65	
Pyrene	1.65647	1,49534	9.73	
Terphenyl-d14	1.0964?	1.12334 1.16416	2.45	
Butylbenzylphthalate	1.15097	1.16416	1.15	
3,3'-Dichlorobenzidine		. 23885		
Chrysene	1.01423	1.00594	.82	
Benzo(a)Anthracene	1.09006	1.17975	8.23	
bis(2-Ethylhexyl)Phthalate	1.34247	1.41121	5.12	
Di-n-octylphthalate	3.72331	3.51316	5.64	•
Benzo(a)Pyrene		1.27515	.35	. #
Benzo(b)[luoranthene	1.48902	1.48580	.22	
Indeno(1,2,3-cd)Pyrene	. 82543	. 89829	8.83	
Dibenzo(a.h)Anthracene	.78966	. 88573	12.17	·
Benzo(k)Fluoranthene	1.51900	1.28454	15,44	
Benzo(a)Pyrene Benzo(b)Fluoranthene Indeno(1,2,3-cd)Pyrene Dibenzo(a,h)Anthracene	1.27071 1.48902 .82543 .78966	1.27515 1.48580 .89829 .88573	.35 .22 8.83 12.17	•

Benzo(g,h,1)Pervlene

.74580 .77977 4.56

RF - Response Factor from daily standard file at 80.00 mg/L

RF - Average Response Factor from Initial Calibration form VI

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

41090072 RE 161664 21.23 110249 29.61 3022 + 3445 90090173 RE 144177 21.23 92778 29.59 9475 + 3445

and the second of the second of

L. L. L.

Senting single

MANAGEMENT OF THE PARTY OF THE

The second of the second second of the second secon

New manuscript

ASSESSMENT OF THE PARTY OF THE

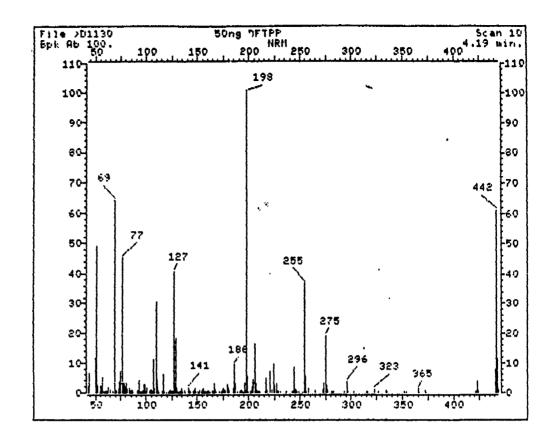
The second

2425

5B SEMIVOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: Engineering Science	Contract:	•		
Lab Code: Case No.:	SAS No.:	SDG No.		
Lab File ID: >D1130	DFTPP Injec	tion Date:	11/30/88	,
Instrument ID: 70 2	DFTPP Injec	tion Time:	15:05	•
m/e ION ABUNDANCE CRITERIA		:	RELATIVE ABUNDANCE	-• -•
51 30.0 - 60.0% of mass 198 68 Less than 2.0% of mass 69 59 Mass 69 relative abundance 70 Less than 2.0% of mass 69 127 40.0 - 60.0% of mass 198 197 Less than 1.0% of mass 198 198 Base Peak, 100% relative abull 199 5.0 - 9.0% of mass 198 275 10.0 - 30.0% of mass 198 365 Greater than 1.00% of mass 1441 Present, but less than mass 1442 Greater than 40.0% of mass 1443 17.0 - 23.0% of mass 442	98 443 98 2-Valu	IE 15 % mass	49.0 0.0(0.0)1 64. .8(1.3)1 40.8 0.0 100. 5.5 19.1 1.38 7.9 61.0 11.5(18.8)2	All
LAB SAMPLE ID	LAB	DATE ANALYZED	TIME :	
01: 40 up/ml BNA STD 02: 88092193 lml REANAL. 03: 88092629 lml REANAL. 04: 88092753 lml REANAL. 05: 88092818 AC REANAL. 06: 88092818 BN REANAL. 07: 88092818 BN MS REAN 08: 88092818 BN MSD REAN 08: 88092818 BN MSD REAN 10: 88092275 AC REANAL. 11: 88092249 lml REANAL. 12: 88092247 lml REANAL. 12: 88092247 lml REANAL.	>E6352	=======================================	15:24 16:32 + 17:25 + 18:24	std ok ok Is ba

1/87 Rev.



File: 201130 Scan #: 10 Rein. inne: 4.	friet	X01130	Scan #:	10	Rein.	iane:	4.19
--	-------	--------	---------	----	-------	-------	------

William Control of the Control of th

Special Control of the Control of th

- C-2-

m/z .	Ird.	n/2	Int.		Int.		Int.		Int.
43.10	2.173	97.15	.742				.860		36.840
44.00	6.583	97.35	2.863	146.10	.419	193.95	.215	255. 9 5	5.378
50.00	11.595	98.95	2.657	147.60	.964	194.95	.163	256.85	.333
51.60	49.037	33.85	.344	147.90	1.592	195.95	3.227	257.95	1.484
52.00	2,420	100.95	1,536	149,00	.516	196.65	.506	256.65	. 333
54.10	.247	102.95	.721	150.80	. 260	197.90	100,000	264.95	.710
55.10	2.426	163.95	.936	151,50	.247	198.80	5. 48 6	272.95	1.086
56.00	2.033	105.05	1.054	152.00	.237	199.90	.376	273. 9 5	3.130
57.00	5.163	105.95	. 355	152.90	.613	201.20	.367	274.95	19.060
58.00	. 301	166.95	11.079	153. 9 5	.441	202.80	.452	275.95	2.409
58.90	. 258	107.95	1.603	155.05	.936	203.90	2,280	276.95	1.194
60.10	.463	109.90	30,440	155.95	1.549	204.90	4,410	280.95	.355
61.00	.839	110.90	4, 281	156.85	. 355	206.00	16.274	281.95	.204
61.90	.516	112.00	.602	157.85	.323	207.00	3.281	282. 9 5	. 280
63.60	1.624	113.00	.154	158.85	. 258	208.00	.710	293.00	. 355
65.80	1.097	115.80	. 430	160.05	.398	200.50	. 333	295.90	3,636
67.05	.817	116.90	6.325	160.95	.914	209.90	.376	296.90	.506
68.95	64.117	118.00	.559	161.85	. 269	210.80	,506	302 .9 0	.419
69.95	. 807	119.00	.194	163.05	.125	216.00	.473	315.00	.333
71.05	.764	121.00	.204	164.85	.645	216.90	4,751	315.90	.280
73.65	1.409	122.10	.484	165.95	.495	217.90	.602	323.00	1.151
73. 9 5	3.672	123.00	1.129	166.95	3.098	220. 9 0		326,80	
74.95	7.153	124.00	. 495	167.85	1.172	222.90	1,183	333. 9 5	.731
76.95	45.219	124.90	.624	168.95	.344	224.00	9.422	334.95	. 269

```
11.22
        3.0/6 125.00
                        .280 111.15
                                       .310 243.00
                                                    4.731 37U.83
                                                                    .415
78.95
        3.453 126.90 40.755 172.85
                                       .430 226.90
                                                    3.291 351.95
                                                                    .409
79.95
       2.022 127.90
                     3.012 173.95
                                       .925 226,00
                                                      .463 353.95
                                                                    .516
        3.410 128.90 18.436 174.95
                                     1.474 228.90
                                                      .914 364.95
                                                                   1.377
62.05 1.312 129.90
                      1.635 175.85
                                       .635 231.00
                                                      .344 365.85
                                                                    .204
83.05
       1.689 130.90
                        .398 176.95
                                                      .118 371.90
                                      .721 233.00
                                                                    .607
81.15
         .613 131.90
                       .194 176.95
                                     2.700 237.00
                                                     .301 372.60
                                                                    . 204
         .671 132.90
                       .312 179.95
                                                                    .527
85.05
                                     1.689 241.95
                                                     .559 420.85
         .968 133.90
85.35
                       .570 180.95
                                      .893 242.95
                                                     .463 421.85
                                                                    . 387
86.95
         .516 135.00
                      1.334 184.95
                                     1.269 243.95
                                                    8.465 422.95
                                                                   3.636
         .904 135.90
90,95
                        .506 185.95
                                     9.422 244.95
                                                     .947 423.65
                                                                    .678
         .731 137.00
52.05
                       .635 186.95
                                     3.001 245.95
                                                    1.215 446.95
                                                                  7.938
92.95
       4.249 137.90
                       .204 166.85
                                      .463 246.95
                                                     .333 441.95 60.955
93.95
         .473 140.90
                      1.613 190.95
                                       .441 248.75
                                                     .355 442.95 11.455
95.65
         .516 142.00
                       .602 191.65
                                      .839 253.05
                                                     .183 443.95 1.129
96.05
         .484 142,90
                       .536
```

Case ho:	Calibration Date: 11/30/0	8
******	*****	**********
Combractor:	Time: 15:24	~
**********		***********
Contract Ho:	Laboratory ID: >E6352	
***********	************	
Instrument ID:	Initial Calibration Date:	10/13/88
******		**********

Mammum RF for SPCC is

Meximum X Orff for CCC is X

Conpound	RF	RF	XOaff	ccc	SPCC
K-Kitroso-Dinethylanine	1.24043	.47401	61.79		
2-Fluor ophenol	1.41512	1.14427	19.37		
bis(2-Chloroethyl)ether	1.41737	1.14703	19.07		
fnenul		1.51661		k	
Fhenol-d5	1.35470	1.46346	8.03		
finiline	.74553	. 39614	16,86		
2-Chlorophenol	1.32069	1.26910	3.92		
1,3-Dichiorobenzene	1.51101	1.45636	3.46		
1,4-Dichlorobenzene	1.51574	1.57567	3, 9 5	٠	
Benzyl Chloride	•	-	•		
Benzyl Ricohol	.56944	.95943	68. 19		
1,2-Gichlorobenzene	1,45179	1,56961	6.12		
2-Methylphenol	1,42392	1.96564	38.04		
3-6-1-Hethylphenol	1.58422	1.26783	19.57		
bis(2-chlorossopropyl)Ether	2.35722	2.79988	18.78		
M-Hitroso-Di-n-Fropylamine	1.13410	1.32073	16.46		**
Hexachioroethane	.70056	.75533	7.62		
Da briomochilor opriopenie	•	•	•		
Kitrobenzene	.56683	.62613	10.46		
Mitrobenzene-d5	.49338	.46671	6.54		
2-Mitrophenol	.22046	.24190	9.75	¥	
Isophorone	.87207	.66018	1.36		
bis(2-Chioroethoxy)nethane	.562 1 0	.60151	3.26		
2,4-Dinethylphenol	.40862	. 39040	4.46		
Benzoic Acid	. 29595	.22433	24.20		
2,4-Bichlorophenol	.53135	.57517	9.00	¥	
1,2,4-Trichlorobenzene	.31739	.33892	6.78		
Naphthalene	. 98196	1.02338	4.22		
4-Chilomografiane	.33116	.32746	1.11		
Hexachlorobutadiene		.20439			
4-Chiloro-3-Methylphenol		. 33351			
2-Methylnaphthalene	.54468	.60352	10.60		

RF - Response Factor from daily standard file at 40.00 mg/L

THE PERSON NAMED IN

RF - Riverage Response Factor from Initial Calibration Form VI

XD:ff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Ferformance Check Compounds (**)

Case Hot		Calibr	ation D	ite:	11/30/	⁷⁸⁶		
Contractor:		Tine: 15:24						
Contract No:		Laboratory IO: >E6352						
Instrument ID:		Initia	l Calib	ati	on Date	: 10/13/68		
Minimum RF for SPEC is		Mexim	nun X Ozi	if f	or CCC	15 X		
Conpound	<u>r</u> r	RF	X01ff	CCC	SPCC			
Hexachlorocyclopentadiene	.33289	.34916	4.89	***	**			
2,4,6-Irichlorophenel	.32295	.32843	1.70	•		•		
2,4,5-Trichlorophenol		.50067						
2-Fluorobiphenyl	1,26699	1.31651	3,51					
2-Chloromephthalene	1.24653	1.18392	5.02					
2-Hitroamiline	.63129	.52774	16.40			v		
Dinethylphthalate	1.33033	1.39104	4.56			•		
2,6-Binitrotoluene	.31816	.35258	16. 91					
Acemaphthylene	1.65820	1.71663	3.64					
3-Hitronnine		.58133						
2,4-Dimitrophenol	.05753	.07370	28.13		₩#			
Acerephthene	1.12644	1.15571	2.60	*				
Orbenzofuran	1.50264	1.56674						
2,4-Granteololuene	.32099	. 30366	3,53					
4-Kitrophenol	.16425	.13076	29.02		£h			
fluorene		1,20067						
Dielfylphtholote		1.43393		•				
4-Chilorophenyl-phenylether		.56624						
1-Histroansline		.23191						
2,4,6-Irabromophenol		.17671						
1,2-Daphenylhydrazane	•	•	•					
filpha-6KC		-	-					
Beta-BHC	_	-	-					
ขึ ้ อกกล-ชิกัน์	•	-	-					
Gelia-8HC	-	-	-					
Heptachier	-	•	-					
fildran	•	-	-					
K-Kitrosodiphenylanine	.41563	.43166	9.35	#				
1,6-Dinatro-2-Hethylphenol	.06606	-	-			•		
1-Bronophenyl-phenylether	.22979	. 25136	9.40					
Kezachi or obenzene	.28768	.33249	15.57					
Fertachior opheriol	.11390	,11330	.53	e.				

RF - Response factor from daily standard file at 40.00 mg/L

IDiff - I Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

Case No:	Calibration Date: 11/30/88						
Contractor:	Laboratory IO: >E6352 Initial Calibration Gate: 10/13/88						
Contract No:							
Instrument ID:							
Minimum RF for SPCC is	Hexamum X Diff for CCC is X						
Compound	RF	RF	XOiff	CCC SP	CC		
fhenanth: ene	1.07960	. 97507	9.68				
finitiracette		1.16955				•	
Di-n-Butylphthalate		1.67291					
1,1°-Dabromobiphenyl	-	•	•				
fluoranthene	1.17566	1.06613	9.32	4			
Heptachlor Epoxide		•	•				
Endosulfan I	-	•	•				
1,1'-000	•	•	•				
Greidran	-	•	-				
Endran	-	-	-				
4,41-000	-	-	-				
Endosulfan II	-	-	•				
Endrin Aldehyde	•	-	•				
4,4'-001	-	•	•				
Endosulfan Sulfate	•	•	-				
Osbulylchior endate	-	-	•				
Bettzadarie	.03775	.01231	67.40				
Fyretie	1.65647	1.63119	10.55				

1.03647 1.32171

1,15097 1,41781

1.01423 1.01685

1.03006 .98906

1.34247 1.67825

3.72331 4.38177

1,27071 1,21747

1.48902 1.41814

.82543 1.00231

.78966 .84302

1.51900 1.37020

.74560 .88117

.12990 .16163

28.54

23.18 24.43

.26

9.27

17.68 *

4.19 +

4.76

21.43

6.76

9.80

18.15

Terphenyl-di4

Chrysene

Gutylbenzylphthelate

Benzo(a)Anthracene

Di-m-octylphthalate

Benzo(b)fluoranthene

Indeno(1,2,3-cd)Pyrene

Osbenzo(a,h)Anthracene

Benzo(k) Fluoranthene

Benzo(g,h,i)Ferylene

Tribute sentitivity

Benzo(a)Pyrene

3,3'-Dichlorobenzidine

bis(2-Ethylhexyl)Phtholate

RF - Response Factor from daily standard file at 40.00 mg/L

RF - fiverage Response Factor from Initial Calibration Form VI

XDiff - X Difference from original average or curve

CCC - Calibration Check Compounds (*) SPCC - System Performance Check Compounds (**)

88 SEMIUOLATILE INTERNAL STANDARD AREA SUMMARY

b Co	ode:		Case	No.:		SAS No.:		SDG No.:	
h Fi	le ID (S	tand	acd):	>F639	52		Data Ar	nalyzed:11/3	80/88
	10 10 10		a. u / -	, 200.	<i>.</i>			ialy Leaving	,0,00
istru	ment ID:	•	70 2	?			Time A	nalyzed: 15	24
	· · · · · · · · · · · · · · · · · ·			· -	·				
								IS3(ANT)	
	******					AREA #		AREA #	
1	12 HOUR	STD	594	23.	7.81	223905.	1 11.31	121729.	16.6
1	UPPER L	TIMI	1188	346.		447810.	1	243458.	
ı	LOWER L	TIMI	297	711.		111953.	•	60865.	
•	SAMPL		•		*****		•	******	
	NO.			,		! !	· ·		•
1			-						
011	88092193	1 m l	679	399.	7.81	241547.	11.28	132469.	16.6
021	88092629	1 m l	510	99.	7.80	150765.	11.30	89181.	16.6
(17.	皇皇の皇ってにス	1 m 1	! フスフ	115	! 755	! 10//277 *	1 11 20	00676 1	16.6
04:	88092818	AC	446	49.	7.81	159564.	11.29	86278.	
	88092818	-	348	193.	7.80	119639.	11.29	67277.	
	88092818					141404.			
	63092818					133584.			
	88092575					144553.			
	88092249					35958.*			
	88092248					33850.+			
	88092247					51186.*			
	88061944	IMT		(3, * i	(,83)	0130.*	الائداا ا	3741.*	10.6
141					' 		<u>'</u>	·	
				'	·		<u>'</u>	·'	
16!							<u>'</u>		
17!	· · · · · · · · · · · · · · · · · · · ·	'					' '		-
18:		· · · · · · · · · · · · · · · · · · ·		'			'		
19:									
20!		<u>'</u>		'		·	' '		
211	····			······································					
•		· · ·			•		· ———		

IS1 (DCB) = 1,4-Dichlorobenzene-d4

IS2 (NPT) = Naphthalene-d8

IS3 (ANT) = Acenaphthene-d8

of internal stansard area.

LOWER LIMIT = - 50%

of internal standard area.

* Column used to flag internal standard area values with an asterisk

page 1 of 1

8C SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

意識を

Lab Name:Engineering	g Science	Contract:	
Lab Code: ES01	Case No.:	SAS No.:	SDG No.:
Lab File ID (Standar	rd): >E6352	Date A	nalyzed:11/30/88
Instrument ID: 7	0 2	Time A	nalyzed: 15:24

+		· <u>·</u>	~	, , , , , , , , , , , , , , , , , , , 		
	IS4(PHN)		155(CRY)		IS3(PRY)	
	AREA #1		AREA #1		AREA #1	
1 12 HOUR STD		•	•		,	
l 12 HOUR SID:					_	
UPPER LIMIT	•		187550.		115912.	,

: LOWER LIMIT			45888.		28953.	
******	******		******			
: EPA SAMPLE	!		l :			
l NO.					!	1
	•		•		•	
1188092193 1ml					-	
2182092629 1ml					_	
3:88092753 1ml	· • · ·	21.24				
4188092818 AC 5188092818 BN		21.26				
5188092818 BN						
7:88092818 BN	- · · - · ·				•	
3188092575 AC					· -	
9:88092249 1ml						
0188092248 1ml				_		
1188092247 1ml	34612.+	21.33				
2188051944 1ml	3719.+1	21.27	2014.*	29.64	181.*	34.5
31					l	
[]			l			
5!					ļ	
7!					·	
31 3;					İ	
):		' 	' 		ii	
11	·		' 		' ' !	
'	' 	' 	'		<u>'</u>	·
· · _	' '		·		·	

```
IS4 (PHN) = Phenanthrene-d10

UPPER LIMIT = + 100%

IS5 (CRY) = Chrysene-d12

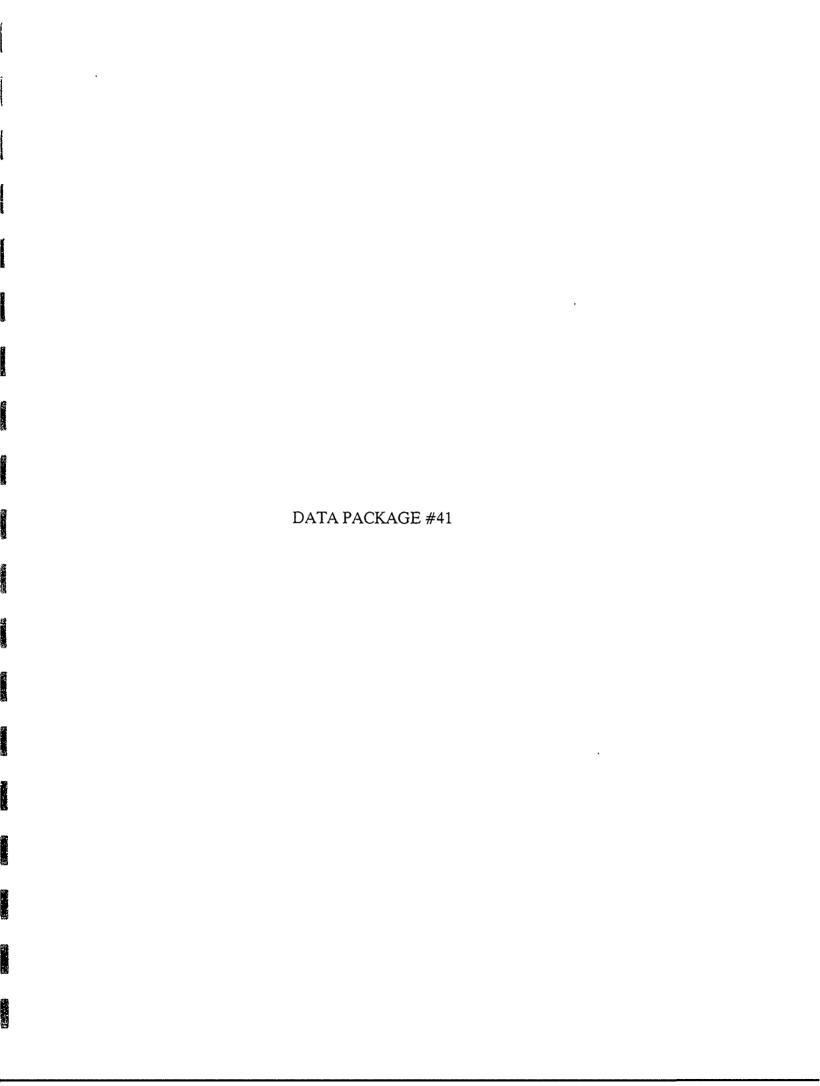
IS6 (PRY) = Perylene-d12

LOWER LIMIT = - 50%

of internal standard area.
```

Column used to flag internal standard area values with an asterisk page 1 of 1

This page intentionally left blank.



This page intentionally left blank.

RESEARCH AND DEVELOPMENT LABORATORY 600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 841-7353

REVISED REPORT

Job No.: OR001

Work Order No.: 876

Client: ES Oak Ridge Attention: Bill Hayden

Address: 710 S. Illinois Avenue

Suite F-103

Oak Ridge, Tn. 37830

Project: Duluth ANGB

Attached are the analytical reports for the soil sample(s) received by this laboratory on 8-18-88.

Sample Preparation Data

œ ,							
	Laboratory Sample No.	Client Sample ID	Test	Date collected	Date* extracted	Date analyzed	Date* 2nd col.
	88081938	DANGB2-MW41-SS1	BA-I	8-17-88		9-18-88	
Here	88081938	DANGB2-MW41-SS1	CD-F	8-17-88		9-16-88	
	88081938	DANGB2-MW41-SS1	CR-F	8-17-88		9-16-88	
-	88081938	DANGB2-MW41-SS1	PB-F	8-17-88		10-03-88	
	88081938	DANGB2-MW41-SS1	418.1	8-17-88	9-14-88	9-15-88	
×.	88081938	DANGB2-MW41-SS1	MOIS	8-17-88		8-24-88	
5-	88081938	DANGB2-MW41-SS1	8010	8-17-88		8-29-88	8-25-88
C DAMPING	88081938	DANGB2-MW41-SS1	8020	8-17-88		8-29-88	8-25-88
	88081938	DANGB2-MW41-SS1	8270	8-17-88	8-26-88	10-03-88	
	88081939	DANGB2-MW41-SS2	BA-I	8-17-88		9-18-88	
	88081939	DANGB2-MW41-SS2	CD-F	8-17-88		9-16-88	
	88081939	DANGB2-MW41-SS2	CR-F	8-17-88		9-16-88	
1	88081939	DANGB2-MW41-SS2	PB-F	8-17-88		10-03-88	
ŀ	88081939	DANGB2-MW41-SS2	418.1	8-17-88	9-14-88	9-15-88	
ı.	88081939	DANGB2-MW41-SS2	MOIS	8-17-88		8-24-88	
-1 24.	88081939	DANGB2-MW41-SS2	8010	8-17-88		8-29-88	8-25-88
ĺ	88081939	DANGB2-MW41-SS2	8020	8-17-88		8-29-88	8-25-88
i i	88081939	DANGB2-MW41-SS2	8270	8-17-88	10-28-88	11-21-88	

* If applicable

Job No.: OR001

Work Order No.: 876

Project: Duluth ANGB

Sample Preparation Data

Laboratory Sample No.	Client Sample ID	Test	Date collected	Date*	Date analyzed	Date* 2nd col.
88081940	DANGB2-MP41-SS1	BA-I	8-17-88		9-18-88	
88081940	DANGB2-MP41-SS1	CD-F	8-17-88		9-16-88	
88081940	DANGB2-MP41-SS1	CR-F	8-17-88		9-16-88	
88081940	DANGB2-MP41-SS1	PB-F	8-17-88		10-03-88	
88081940	DANGB2-MP41-SS1	418.1	8-17-88	9-14-88	9-15-88	
88081940	DANGB2-MP41-SS1	MOIS	8-17-88	J 14 00	8-24-88	
88081940	DANGB2-MP41-SS1	8010	8-17-88		8-29-88	8-25-88
88081940	DANGB2-MP41-SS1	8020	8-17-88		8-29-88	8-25-88
88081940	DANGB2-MP41-SS1	8270	8-17-88	8-26-88	10-05-88	0 20 00
88081941	DANGB2-MW41-SS3	BA-I	8-17-88		9-18-88	
88081941	DANGB2-MW41-SS3	CD-F	8-17-88		9-16-88	
88081941	DANGB2-MW41-SS3	CR-F	8-17-88		9-16-88	
88081941	DANGB2-MW41-SS3	PB-F	8-17-88		10-03-88	
88081941	DANGB2-MW41-SS3	418.1	8-17-88	9-14-88	9-15-88	
88081941	DANGB2-MW41-SS3	MOIS	8-17-88		8-24-88	
88081941	DANGB2-MW41-SS3	8010	8-17-88		8-26-88	8-30-88
88081941	. DANGB2-MW41-SS3	8020	8-17-88		8-26-88	8-30-88
88081941	DANGB2-MW41-SS3	8270	8-17-88	10-28-88	11-01-88	
88081942	DANGB2-MP41-SS2	BA-I	8-17-88		9-18-88	
88081942	DANGB2-MP41-SS2	CD-F	8-17-88		9-16-88	
88081942	DANGB2-MP41-SS2	CR-F	8-17-88		9-16-88	
88081942	DANGB2-MP41-SS2	PB-F	8-17-88		10-03-88	
88081942	DANGB2-MP41-SS2	418.1	8-17-88	9-14-88	9-15-88	
88081942	DANGB2-MP41-SS2	MOIS	8-17-88		8-24-88	
88081942	DANGB2-MP41-SS2	8010	8-17-88		8-26-88	8-30-88
88081942	DANGB2-MP41-SS2	8020	8-17-88		8-26-88	8-30-88
88081942	DANGB2-MP41-SS2	8270	8-17-88	10-28-88	10-02-88	

^{*} If applicable

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
SAMPLE NO(S).: 88081938-88081942
WORK ORDER NO.: 876

These soil samples were received at the ES Berkeley Laboratory on 8-18-88. They were received cold and intact.

Samples 88081939, 88081941 and 88081942 for Method 8270 were initially extracted and analyzed within holding time. However, the surrogate spike recovery was not within the accepted range, thus, they were re-extracted and analyzed out of the holding time. The surrogate spike recoveries for the re-analysis were within the acceptable range.

ENGINEERING-SCIENCE INC. 12/09/88 PAGE 1

ANALYSIS REPORT

WORK ORCER NUMBER: 876

JOB NUMBER : 280000000440

WORK ORDER DATE : 08/18/88

APPROVED BY

Lab Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134) 710 S. ILLINOIS AVE. STE. S103

710 3. ILLINOIS AVE. SIE, SIC

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

CONTACT

(615)-481-3920

TASK: 2, UNITS: mg/Kg

DANGB2-MW41-SS1 DANGB2-MW41-SS2 DANGB2-MP41-SS1 DANGB2-MW41-SS3 DANGB2-MP41-SS2

TEST COMPOUND	88081938	88081939	88081940	88081941	88081942
ACID DIG SOIL	NA .	NA	NA	NA ·	NA
SARIUM	51.7	62.8	59.5	35.4	62.5
CADMIUM	12.0*N	9.8*N	12.6*N	11.8*N	10.0*א
CHROMIUM	27.1	25.6	33.1	23.1	23.4
LEAD	8.6N	5.3N	8.4SN	4.1SN	5.2N

ENGINEERING-SCIENCE INC. 12/09/88

PAGE 2

ANALYSIS REPORT

WORK ORDER NUMBER:

876

JOB NUMBER : 280000000440

APPROVED BY

I ah Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

WORK ORDER DATE : 08/18/88

710 S. ILLINOIS AVE. STE. \$103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. \$103

DAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 3, UNITS: mg/Kg

DANGB2-MW41-SS1 DANGB2-MW41-SS2 DANGB2-MP41-SS1 DANGB2-MW41-SS3 DANGB2-MP41-SS2

•	TEST COMPOUND	88081938	88081939	88081940	88081941	88081942
7	418.1 PETROLEUM HYDROCARBONS X MOISTURE	<100 15.8	<100 18.0	130 13.4	<100 · 9.0	<100 17.6

ND - Not Detected

ENGINEERING-SCIENCE INC. 12/09/88

ANALYSIS REPORT

WORK ORDER NUMBER: 876

JOB NUMBER : Z80000000440

WORK ORDER DATE : 08/18/88

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: ug/kg, GROUP 8010

DANGB2-MW41-SS1 DANGB2-MW41-SS2 DANGB2-MP41-SS1 DANGB2-MW41-SS3 DANGB2-MP41-SS2

TEST COMPOUND	88081938	88081939	88081940	88081941	88081942
		***************************************	•••••	•••••	**********
BENZYL CHLORIDE	ND	ND	ND	ND ·	ND
BIS (2-CHLOROETHOXY)METHANE	ND	ND	ND	ND	ND
BIS (2-CHLOROISOPROPYL)ETHER	ND	ND	ND	ND	ND
BROMOBENZENE	ND	ND	ND	ND	ND
GROMODICHLOROMETHANE	ND	ND	ND	ND	ND
BROMOFORM	ND	ND	ND	ND	ND
BROMOETHANE	ND	ND	ND	ND	ND
CARSON TETRACHLORIDE	ND	ND	ND	ND	ND
CHLGRACETALDEHYDE	ND	ND	ND	ND	ND
CHLORAL	ND	ND	ND .	ND	ND
CHLOROBENZENE	ND	ND	ND	ND '	ND
CHLCROETHANE	ND	ND	ND	ND	ND
CHLOROFORM	0.68	0.5B	ND	ND	ND
1-CHLOROHEXANE	ND	ND	ND	ND	ND
2-CHLCROETHYL VINYL ETHER	ND	ND	ND	ND	ND
CHLOROMETHANE	ND	ND	ND	ND	ND
CHECROMETHYL METHYL ETHER	ND	ND	ND	סא	ND
CHLCROTOLUENE	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	ND	ND	ND	ND
DISROHOHETHANE	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENÉ	NO	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	D	ND	ND
1,1-DICHLOROETHYLENE	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHYLENE	ND	ND	ND	ND	ND
DICHLOROMETHANE	6.88	5.48	5.68	3.48	3.86
1,2-DICHLOROPROPANE	NO	ND	ND	ND	ND

ENGINEERING-SCIENCE INC. 12/09/88

ANALYSIS REPORT FOR WORK ORDER NUMBER 876

	TEST CO-POLIND	DANGB2-MW41-SS1 88081938	DANG82-MW41-SS2 88081939	DANG82-MP41-SS1 88081940	DANGB2-MW41-SS3 88081941	DANGB2-MP41-SS2 88081942
	1,3-DICHLOROPROPYLENE 1,1,2,2-TETRACHLOROETHANE	ND ND	ND ND	ND ND	ND ND	ND ND
	1,1,1,2-TETRACHLOROETHANE TETRACHLOROETHYLENE	ND ND	ND ND	ND ND	ND ND	ND ND
	1,1,1-TRICHLOROETHANE 1,1,2-TRICHLOROETHANE	ND ND	ND ND	ND ND	ND ND	ND ND
	TRICHLOROETHYLENE TRICHLOROFLUOROMETHANE TRICHLOROPRUPANE	ND ND ND	ND ND	ND ND ND	ND ND	ND ND
4.	VINYL CHLORIDE	ND	ND	ND	ND	ND

ND . Not Detected

ANALYSIS REPORT

WORK ORDER NUMBER: 876

JOB NUMBER : 280000000440

WORK ORDER DATE : 08/18/88

APPROVED BY

Lab Supervisor

REPORT DATA:

ES OAK RIDGE/DULUTH ANGB 710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

BILL HAYDEN

CLIENT DATA:

ES OAK RIDGE/DULUTH ANGB (134)

710 S. ILLINOIS AVE. STE. S103

OAK RIDGE, TN 37830

OF REPORT COPIES: 1

CONTRACT / PO # : OROO1

CONTACT

: BILL HAYDEN

(615)-481-3920

TASK: 4, UNITS: Ug/Kg, GROUP 8020

DANGB2-MW41-SS1 DANGB2-MW41-SS2 DANGB2-MP41-SS1 DANGB2-MW41-SS3 DANGB2-MP41-SS2

TEST COMPOUND	88081938	88081939	88081940	88081941	88081942
BENZENE	ND	ND	ND	ND 4	ND
CHLCROSENZENE	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
ETHYL BENZENE	ND	ND	ND	ND	ND
TOLUENE	4.2	57	29	47	200
XYLENES	ND	ND	ND	ND	ND

rate Received: August 18, 1988 te Reported: December 6, 1988

The state of the s

Work Order: 876 Job Number: OR001

FOR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Oak Ridge, TN 37830

b Number:	88081938	88081940
b Number:	DANGB2-MW41-SS1	DANGB2-MP41-SS1
	8-17-88	8-17-88
Date Sampled: me Sampled: Lite Extracted:	11:25	8:40
Ate Extracted:	8-26-88	8-26-88
Date Analyzed:	10/3/88	10/5/88
Trcent Moisture:	16	13

Compound	Detection		ICAL RESULTS	
G THE STATE OF THE	Limits	, ,	y weight)	
Name of the last o	ug/kg	ug/kg	ug/kg 	
1_3-Dichlorobenzene	330	ND	ND	
4-Dichlorobenzene	330	ND	ND	
1.xachloroethane	330	ND	ND	
3is(2-chloroethyl)ether	330	ND	ND	
2-Dichlorobenzene Nitrosodimethylamine	330	ND	ND	
Nitrosodimethylamine	330	ND	ND	
Bis(2-chloroisopropyl)ethe	er 330	ND	ND	
N-Nitrosodi-n-propylamine	330	ND	ND	
xachlorobutadiene	330	ND	ND	
1,2,4-Trichlorobenzene	330	ND	ND	
Nitrobenzene	330	ND	ND	
ophorone	330	ND	ND	
phthalene	330	ND	ND	
3is(2-chloroethoxy)methane	330	ND	ND	
	330	ND	ND	
xachlorocyclopentadiene	330	ND	ND	
Acenaphthylene	330	ND	ND	
1cenaphthene	330	ND	ND	
methyl phthalate	330	ND	ND	
₹,6-Dinitrotoluene	330	ND	ND	
Fluorene	330	ND	ND	
₹4-Dinitrotoluene	330	ND	ND	
lethyl phthalate	330	ND	ND	
N-Nitrosodiphenylamine	330	ND	ND	
exachlorobenzene	330	ND	ND	

^{3 =} Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

te Received: August 18, 1988 Work Order: 876 te Reported: December 6, 1988 Job Number: OR001

R: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

dress: 710 S. Illinois Ave, Suite F-103

⊃ Number:	88081938	88081940
mple No.:	DANGB2-MW41-SS1	DANGB2-MP41-SS1
te Sampled:	8-17-88	8-17-88
ne Sampled:	11:25	8:40
te Extracted:	8-26-88	8-26-88
te Analyzed:	10/3/88	10/5/88
rcent Moisture:	16	13

mpound	etection Limits	etection ANALYTICAL RESULTS Limits (dry weight)		
	ug/kg	ug/kg	ug/kg	
enanthrene	330	ND	ND	
thracene	330	ND	ND	
butyl phthalate	330	ND	ND	
loranthene	330	ND	ND	
Chlorophenyl phenyl ether	330	ND	ND	
rene	330	ND	ND	
tyl Benzyl phthalate	330	ND	ND	
s(2-ethylhexyl) phthalate	∋ 330	ND	ND	
rysene	330	ND	ND	
Bromophenyl phenyl ether	330	ND	ND	
nzo(a)anthracene	330	ND	ND	
-n-octylphthalate	330	ND	ND	
nzo(b)fluoranthene	330	ND	ND	
nzo(k)fluoranthene	330	ND	ND	
nzidine	2000	ND	ND	
3'-Dichlorobenzidine	660	ND	ND	
nzo(a)pyrene	330	ND	ND	
<pre>leno(1,2,3-cd)pyrene</pre>	330	ND	ND	
penzo(a,h)anthracene	330	ND	ND	
nzo(ghi)perylene	330	ND	ND	
nzyl Alcohol	660	ND	ND	

⁼ Compound was detected in the blank.

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 18, 1988
Date Reported: December 6, 1988

· 「一般のではないないないできないない。」というないできないないできないのできないできないないできないないできないできない。 「「一般のではないないないないないないない。」

Work Order: 876
Job Number: OR001

r: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Lab Number:	88081938	88081940
Sample No.:	DANGB2-MW41-SS1	DANGB2-MP41-SS1
Sample No.: ite Sampled: Time Sampled:	8-17-88	8-17-88
Fime Sampled:	11:25	8:40
Date Extracted:	8-26-88	ა−26−88
Tite Analyzed:	10/3/88	10/5/88
ircent Moisture:	16	13

@nmpound	Detection Limits		ical Results y weight)
	ug/kg	ug/kg	ug/kg
etophenone	×	ND	ND
Adiline	 ★	ND	ND
4-Aminobiphenyl	*	ND	ND
<pre>Chloroaniline</pre>	660	ND	ND
<pre>Chloronaphthalene</pre>	*	ND	ND
Dibenzofuran	330	ND	ND
g-Dimethylaminoazobenzene	*	ND	ND
12-Dimethylbenz(a)anthra	cene*	ND	ND
a-,a-Dimethylphenethylamin		ND	ND
Diphenylamine	*	ND	ND
2-Diphenylhydrazine	*	ND	ND
hyl methanesulfonate	*	ND	ND
3-Methylcholanthrene	·	ND	ND
of thyl methanesulfonate	*	ND	ND
Methylnaphthalene	330	ND	ND
1-Naphthylamine	*	ND	ND
2-Naphthylamine	*	ND	ND
Nitroaniline	1600	ND	ND
3-Nitroaniline	1600	ND	ND
4-Nitroaniline	1600	ND	ND
Nitroso-di-n-butylamine	×	ND	ND
M Nitrosopiperidine	*	ND	ND
Pentachlorobenzene	 ★	ND	ND
antachloronitrobenzene	*	ND	ND
f enacetin	*	ND	ND
2-Picoline	*	ND	ND
Pronamide	*	ND	ND
1 2,4,5-Tetrachlorobenzene	?	ND	ND

EPA has not yet determined detection limits for these compounds.

E = Compound was detected in the blank.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

te Received: August 18, 1988 Work Order: 876 te Reported: December 6, 1988 Job Number: OR001

₹: ES:Oak Ridge/Duluth ANGB ATTN: Mr. Bill Hayden

iress: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

> Number:	88081938	88081940
aple No.:	DANGB2-MW41-SS1	DANGB2-MP41-SS1
te Sampled:	8-17-88	8-17-88
ne Sampled:	11:25	8:40
te Extracted:	8-26-88	8-26-88
te Analyzed:	10/3/88	10/5/88
ccent Moisture:	16	13

npound	Detection Limits			
	ug/kg	ug/kg	ug/kg	
oha-BHC	*	ND	ND	
nma-BHC	*	ND	ND	
ta-BHC	660	ND	ND	
otachlor	330	ND	ND	
lta-BHC	500	ND	ND	
drin	330	ND	ND	
stachlor epoxide	330	ND	ND	
iosulfan I	*	ND	ND	
eldrin elektrica	500	ND	ND	
4'-DDE	1000	ND	ND	
irin	 ∗	ND *	ND	
dosulfan II	*	ND	ND	
4'-DDD	500	ND	ND	
i'-DDT	830	ND	ND	
dosulfan Sulfate	1000	ND	ND	
irin aldehyde	*	ND	ND	
irin Ketone	*	ND	ND	
cordane	2000	ND	ND	
choxychlor	*	ND	ND	
kaphene	2000	ND	ND	
oclor-1016	2000	ND	ND	
oclor-1221	2000	ND	ND	
oclor-1232	2000	ND	ND	
oclor-1242	2000	ND	ND	
oclor-1248	2000	ND	ND	
oclor-1254	2000	ND	ND	
oclor-1260	2000	ND	ND	

EPA has not yet determined detection limits for these compounds.

⁻ Compound was detected in the blank.

Priority Pollutant Analysis Acid Extractables -- SW 8270 Matrix: Soil

្សឺate Received: August 18, 1988 Qate Reported: December 6, 1988 Work Order: 876
Job Number: OR001

ES:

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

িন্দ Number:	88081938	88081940
inple No.:	DANGB2-MW41-SS1	DANGB2-MP41-SS1
Date Sampled:	8-17-88	8-17-88
<u> </u>	11:25	8:40
ite Extracted:	8-26-88	8-26-88
Late Analyzed:	10/3/88	10/5/88
Percent Moisture:	16	13

mpound	Detection Limits		ICAL RESULTS y weight)
g	ug/kg	ug/kg	ug/kg
z-Chlorophenol	330	ND	ND
2-Nitrophenol	330	ND	ND
[ienol	330	ND	ND
4-Dimethylphenol	330	ND	ND
2,4-Dichlorophenol	330	ND	ND
4,6-Trichlorophenol	330	ND	ND
·Chloro-3-methylphenol	660	ND	ND ·
2,4-Dinitrophenol	1600	ND	ND
2.6-Dichlorophenol	*	ND	ND
Methyl-4,6-Dinitrophenol	l 1600	ND	ND
#entachlorophenol	1600	ND	ND
4-Nitrophenol	1600	ND .	ND
inzoic Acid	1600	ND	ND
d Methylphenol	330	ND	ND
3- & 4-Methylphenol	330	ND	ND
	×	ND	ND
3,4,6-Tetrachlorophenol 4,5-Trichlorophenol	330	ND	ND

Analyst/

Laboratory Supervisor

EPA has not yet determined detection limits for these compounds.

3 = Compound was detected in the blank.

TE: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

ENGINEERING STIENCE Pricity scalabant analysis Base Neutrals - SW 8270 Matrix: Soil

tte Receivel: August 13, 1999 tte Reported: November 34, 1988

Work Order: 976 Job Number: OR001

ATTN: Mr. Fill Bayden

ORG Lidteosi

ES:Oak Ringe/Duluth ANGB

710 S. Illinois Ave, Suite F-103

a Number:	#808_93°
made NV. s	DANGB2-MW41-SS3
	· REEXTRACT
នាក្រ និងពេល (G.S.)	3-57-60
्रांको विस्ताहर _{विस्} रे	*) .
in. Extraction	54-12-85
the Analypylo	11-31 88
errent Meirthiev	↓ ₹
t a decida en en en en en en en en en en en en en	end de 23 May mang de nan kanala i de la la la la la la la la la la la la la

dapourer	Detection Limits AT Mg	ANALYTICAL RESULTS (dry weight) ut/kg	
, c-Dichlor bancene		\	
1,4-D:chlorobensene	13";	ND	
evachloroethane	330	$\sum_{i=1}^{n} f_i$	
.is(2-cnloroethyl)ether	230	ND	
,2-Dichlorobenzene	23.1	N1	
-Nitrosodimethylamine	3.0	ND	
- 1314-chloreisoprepyl)ethe	20	N1	
. Nitrosodi-n-propylamin-	J 3 1	MT)	
:Machleroputadishe	130	ND .	
.2,4-Tricalor benzene	330	ND	
trorencene	320	χ :	
pephorone	247	N ²	
- ខ្មាំកំពស់ខេត្តខ		λ	
- il(l-chlorpet.oxy)methane	5.5.C	Σ	
.nleronaphthalohe	230	MD	
Texachlorolyclopentalione	320	MD	
scenarourlens	239	N.C.	
ocenabathene	ابو ہے		
ipetnyl pitnalate	ر ٿ .)	N^{r}	
,5-Dinitrotolaens	£30	ND	
fluorene	000	ND	
,A-Dinitropoluene	J J ()	ND:	
lethyl phthalate	: 3 O	NO	
Nitrosodiphenylamine	J30	ХD	
sexachloropensens	330	N.O.	

Fig rity Follutant Analysis Ease Neutrals - SW 817 Matrix: Foil (continued)

Date Received: August 18, 1988 Date Reported: November 29, 1988

Work Order: 876 Job Number: Oku01

ATTN: Mr. Bill Hayden

ES:Oak Ridge/Duluth ANGB

Date Sampled:

経済を表現できたできるのからいちゃくうじゃんけ

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

Lab Number: Sample No.: 88081939

DANGB2-MW41-SS2

REEXTRACT 8-17-99

Time Sampled: 12:13

Date Extracted: 11-28-88 Date Analyzed: 11-21-88

Percent Moistures 13

Competition (Detection Limits Ag/kg	ANALYTICAL DESULTS (dry weight) ag/kg	
T Phenanthrene		ND	
Anthracene	337)	N2r	
Anthracene Dibunyl phthalate	330	ND	
_ Fluoranthene	330	NI:	
4-Chlorophenyl phenyl et	her 330	NC;	
Pyrene	3 3 0	GA	
Butyl Benzyl phthalate	330	ZĐ	
Eis(2-ethylhexyl) phthal	ate 3in	ND	
Carysens	330	<u>````</u>)	
4-bromophenyl phenyl eth	er , 330		
r Banzo(a)anthracene	≎.∪	1177	
li-n-octylphthalate	300	ND:	
Eenso(b)fluoranthene	530	$\mathcal{N}_{\mathcal{I}_{i}}$	
_Benze'k)fluoranthene Benzidine	230	$\lambda \mathcal{D}$	
	2070	$\lambda \mathcal{D}$	
3,3'-Dichlorobenzidine		ND	
Bench(a)pyrene	230	$\mathcal{Q}A$	
Tindeno(1,2,3-cd)pyrene		C.A.	
Dibenz (s,n)anthracene		$N2^{q}$	
	330	NI	
- Benzyl Alcohol	550	ND	

Page 3 of 5

ate Received: August 18,		Work Order: 876 Job Number: OR001
or: ES:Oak Ridge/Dulu wsiresc: 710 S. Illinois A Oak Ridge, TN 37	ve, Suite F-163	ATTN: Mr. Fill Hayden
AN Number: Comple No.: Ite Sampled: Ing Sampled: Lang Extracted: ata Analyzed: Extracted:		88081909 DANGRO-MW41-872 RFEXTRAC 1 5-17-88 11-81-88 11-01-88
niound	Detection Limits up/kg	Analytical Results (427 weight) ug/kg
kcetophenone	~=x	ΝĎ
aniline	 *	$N\mathbb{Z}'$
Aminobiphenyl	×	ND
Chloroaniline	660	, %D
-Chloronaphthalene	 *	N2)
ibenzofuran	300	NO
-Dimernylamitoarobenzene		ΧΪλ
2-Dimethylpenz(a)anthra		3.2
,s-Dimethylphenethylamin	⊕	NI)
:: cenylamine		ND
		ND
tryl methanesul.onato		NG:
	*	10.23
anyl mathanesulfenate		MD
	7.5	N_{ω}^{2}
Narminylamine	4	Nr.

EFA has not yet determined detection limits for there or points.

.- + y

150.

1500

1550

--- A

- caphrny.cacine
--wirtoantline

-Viti samiline

--Nitroani.ine

nenacetii. - Picoline

ronamide

. Aitroso-di-n-butylamine

1,2,4,3-Tetrachior behaves

lentach.oronitio.enzene

.-Nitrosopiperidine

ventachuci Sbenzene

1.0

 $\chi \mathcal{D}$

AD

 $N \lambda$

ND

.....

ND ND

ND

 $N_{i,j}$

RD.

N(A)

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Date Received: August 18, 1988 Date Reported: November 29, 1988

Work Order: 876 Job Number: 08001

FOR:

ES:Oak Ridge/Duluth ANGE

ATIN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Oak Ridge, TN 37830

 Lab Number:
 88081039

 Sample No.:
 DANGB2-MW41-SS2

 REEXTRACT
 8-17-68

 Date Sampled:
 12:15

 Date Extracted:
 10-28-88

 Date Analized:
 11-21-88

 Deitent Neibrare:
 18

_ Compout.∕i	Detection Limits ug/kg	ANALYTICAL RESULTS (dry weight) ug/kç	
Alpha-BHC	A	NI)	
r- Gamma-BHC	ser our d	72)	
Peta-PHC	660	$\Sigma^{\mathfrak{D}}$	
Heptachlor	339	7.0	
Delta-BHC	50(ZD	
Albrin	239	$N\omega$	
Reptachlor epunite	330	$N_{\mathcal{L}}$	
Endosulfan i	 •	ND	
ldel artı	5 1 ×	V.23	
4,4'-DDE	1000	NI.	
Endrin	** ^ A	NT3	
Endopulfan 11	Х.	A-21	
4,41-DD	4.	NC.	
4,4'-DDT	<u>. : ع</u>	,\ _w }	
Endorulfan Sulfate	10.70	$\lambda \omega$	
Endrin alcehyde		ND	
Endich, Ketone	*	Σ_{L}^{2}	
Chlordane	2000	N.	
Methoxychlor	>	ND	
Coxaphene	2000	NO	
Ar solor -1816	2 11/1/	MD	
. Apoplor -1021	4000	ND:	
Arbelor-1201	2009	<i>N</i> .7)	
- Areclor-1242	2000	7,")	
Arocloselasc	2000	ND)	
Aroclor-13:4	2040	5(1)	
Aroclor-1.6.	2000	$\chi_{\mathcal{D}}$	

EPA has not yet determined detection limits for these compounds.

200

rate Received: August 18, 1988 rate Reported: November 29, 1985

Work Order: 876 Job Number: OR001

ES:Oak Ringe/Duluth ANGB

ATTN: Mr. Bill Hayden

Widress:710 S. Illinois Ave, Suite F-103 Oak Ridge, "N 37830

원생하는 (취임) as Numbers cample No.: DANGBO-MW41-SSS -REEXTRACT 8-17-88 ste Sampled: ime Sampled: 12:15 wate Extracted; 10-28-88 ate Analyzed: 11-21-88 Percent Moisture: 18

lonpound	Detection Limits Ug/kg	ANALYTICAL RESULTS (dry weight) ug/kg	ag/kg
and the same was the same and the same and the same and the same and the same and the same and the same and the			
z-Chlorophenol	330	ND	
:-Nitrophenol	330	AT CONTRACTOR OF THE PROPERTY	
nonci	33)	$\Sigma \mathfrak{I}$	
.4-Dimethylphenol	: 3	N.D	
.,4-Eichlerophenel	J. 2 C	N.2	
1, 4, 4-Trichloropaenel	3.3	N.,>	
conford-I-methylphenol	€ (1)	XI.	
,4-Din:zrophenol	1500	ND	
,6-Dichlerophenol	<i>y</i>	77.5	
. Yethyl-4,t-Dinftropnonol	1500	ND	
entachlorophenol	26) (NO	
e-Nitrophenol	2500	N.O.	
onzoic Acu:	1000	ND.	
1-Methylphenol	30)	ND:	
8 4-Metnylphenol	330	ND)	
1,3,4,6-Tetrachlorophenol	*	NĐ	
.,4,5-Trichlo:ophenol	330	N.D.	

Laboratory Supervisor

EPA has not yet determined defection limits for these compounds.

. . Compound was detected in the blank,

2454

ENGINEERING SCIENCE Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil

Date Received:

August 18, 1988

Work Order: 876

Date Reported:

November 29, 1988

Job Number: OR001

FOR:

、自動物の対象の対象が対象が対象が対象が対象が対象ができない。

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:

710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830

Lab Number:	88081941	88081942
Sample No.:	DANGB2-MW41-SS3	DANGB2-MP41-SS2
	REEXTRACT	REEXTRACT
Date Sampled:	8-17-88	8-17-88
Time Sampled: .	13:50	21:15
Date Extracted:	10-28-88	10-28-88
Date Analyzed:	11-01-88	11-02-88
Percent Moisture:	9	18

Compound	Detection Limits		AL RESULTS weight)
	ug/kg	ug/kg	ug/kg
1,3-Dichlorobenzene	330	ND	ND
1,4-Dichlorobenzene	330	ND	ПО
Hexachloroethane	330	ND	ND
Bis(2-chloroethyl)ether	330	ND	ND
1,2-Dichlorobenzene	330	ND	ND
N-Nitrosodimethylamine	330	ND	ND
Bis(2-chloroisopropyl)ethe	er 330	ND	ND
N-Nitrosodi-n-propylamine	330	ND	ND
Hexachlorobutadiene	330	ND	ND
1,2,4-Trichlorobenzene	330	СИ	ND
Nitrobenzene	330	ND	ND
Isophorone	330	DN	ND
Naphthalene	330	ND	ND
Bis(2-chloroethoxy)methane	e 330	ND	ND
2-Chloronaphthalene	330	ND	ND
Hexachlorocyclopentadiene	330	ND	ND
Acenaphthylene	330	ND	ND
Acenaphthene	330	ND	ND
Dimethyl phthalate	330	ND	ND
2,6-Dinitrotoluene	330	ND	ND
Fluorene	330	ND	ND
2,4-Dinitrotoluene	330	ND	ND
Diethyl phthalate	330	ND	ND
N-Nitrosodiphenylamine	330	ND	ND
Hexachlorobenzene	330	ND	ND

Priority Pollutant Analysis Base Neutrals - SW 8270 Matrix: Soil (continued)

Date Received: August 18, 1988 Work Order: 876
Date Reported: November 29, 1988 Job Number: 0R001

FOR: ES:Oak Ridge/Duluth ANGB^{*} ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Lab Number:	88081941	88081942
Sample No.:	DANGB2-MW41-SS3	DANGB2-MP41-SS2
	REEXTRACT	REEXTRACT
Date Sampled:	8-17-88	8-17-88
Time Sampled:	13:50	21:15
Date Extracted:	10-28-88	10-28-88
Date Analyzed:	11-01-88	11-02-88
Percent Moisture:	9	18

Compound	etection Limits	ANALYTICAL (dry wei		
	ug/kg	ug/kg	ug/kg	
Pnenanthrene	330	GN	ND	
Anthracene	330	ND	ND	
Dibutyl phthalate	330	ND	ND	
Fluoranthene	330	ПD	ND	
4-Chlorophenyl phenyl ether	330	ND	ND	
Pyrene	330	ND	ND	
Butyl Benzyl phthalate	330	ND	ND	
Bis(2-ethylhexyl) phthalate	e 330	ND	ND	
Chrysene	330	ND	ND	
4-Bromophenyl phenyl ether	330	ND	ND	
Benzo(a)anthracene	330	ND	ND	
Di-n-octylphthalate	330	ND	ND	
Benzo(b)fluoranthene	330	ND	ND	
Benzo(k)fluoranthene	330	ND	ND	
Benzidine	2000	ND	ND	
3,3'-Dichlorobenzidine	660	ND	ND	
Benzo(a)pyrene	330	ND	ND	
Indeno(1,2,3-cd)pyrene	330	ND	ND	
Dibenzo(a,h)anthracene	330	ND	ND	
Benzo(ghi)perylene	330	ND	ND	
Benzyl Alcohol	660	ND	ND	

Date Received: August 18, 1988 Daté Reported: November 29, 1988

Work Order: 876 Job Number: OR001

ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103

Lab Number:	88081941	88081942
Sample No.:	DANGB2-MW41-SS3	DANGB2-MP41-SS2
	REEXTRACT	REEXTRACT
Date Sampled:	8-17-88	8-17-88
Time Sampled:	13:50	21:15
Date Extracted:	10-28-88	10-28-88
Date Analyzed:	11-01-88	11-02-88
Percent Moisture:	9	18

Compound	Detection Limits	•	al Results weight)
	ug/kg	ug/kg	ug/kg
Acetophenone	*	ND	ND
Aniline	***	DN	NO
4-Aminobiphenyl	~~*	ND	ND
4-Chloroaniline	660	CN	ND
1-Chloronaphthalene	+	ND	ND
Dibenzofuran	330	ND	ND
p-Dimethylaminoazobenzene	*	ND	ND
7,12-Dimethylbenz(a)anthrac	cene+	ND	ND
a-,a-Dimethylphenethylamine	·+	ND	ND
Diphenylamine	*	ND	ND
1,2-Diphenylhydrazine	*	ND	ND
Ethyl methanesulfonate	*	DN	ND
3-Methylcholanthrene	*	ND	ND
Methyl methanesulfonate	*	ND	ND
2-Methylnaphthalene	330	ON	ND
1-Naphthylamine	¥	ND	ND
2-Naphthylamine	*	ND	ND
2-Nitroanıline	1600	ND	DИ
3-Nitroanıline	1600	ND	ND
4-Nitroaniline	1600	ND	ND
N-Nitroso-di-n-butylamine	*	ND	ND
N-Nitrosopiperidine	-~*	ทบิ	ND
Pentachlorobenzene	*	ND	ND
Pentachloronitrobenzene	*	ND	ND
Phenacetin	~~*	ND	ND
2-Picoline	*	ND	ND
Pronamide	~~*	ND	П
1,2,4,5-Tetrachlorobenzene	~~*	ND	ND

^{*} EPA has not yet determined detection limits for these compounds.

Priority Pollutant Analysis Pesticides and PCBs - SW 8270 Matrix: Soil

Work Order: 876 Date Received: August 18, 1988 Date Reported: November 29, 1988 Job Number: OR001

ES:Oak Ridge/Duluth ANGB ATTN:Mr. Bill Hayden

Address: 710 S. Illinois Ave, Suite F-103 Oak Ridge, TN 37830

Lab Number: Sample No.:	88081941 DANGB2-MW41-SS3 REEXTRACT	88081942 DANGB2-MP41-SS2 REEXTRACT
Date Sampled:	8-17-88	8-17-88
Time Sampled:	13:50	21:15
Date Extracted:	10-28-88	10-28-88
Date Analyzed:	11-01-88	11-02-88
Percent Moisture:	9	18

Compound	Detection Limits		TICAL RESULTS ry weight)
	ug/kg	ug/kg	nā\kā
Alpha-BHC	*	ND	ND
Gamma-BHC	*	ND	ND
Beta-BHC	660	ND	ND
Heptachlor	330	ND	ND
Delta-BHC	500	ND	ND
Aldrin	330	ND	ND
Heptachlor epoxide	330	ND	ND
Endosulfan I	*	ND	ND
Dieldrin	500	ND	ND
4,4'-DDE	1000	ND	ND
Endrin	*	ND	ND
Endosulfan II	*	ND	ND
4,4'-DDD	500	ND	ND
4,4'-DDT ·	830	ND	ND
Endosulfan Sulfate	1000	ND	ND
Endrin aldehyde	+	ND	ND
Endrin Ketone	*	ND	ND
Chlordane	2000	ND	ND
Methoxychlor	*	ND	ND
Toxaphene	2000	ND	ND
Aroclor-1016	2000	ND	ND
Aroclor-1221	2000	ND	ND
Aroclor-1232	2000	ND	ND
Aroclor-1242	2000	ND	ND
Aroclor-1248	2000	ND	ND
Aroclor-1254	2000	ND	ND
Aroclor-1260	2000	ND	ND

2458

^{*} EPA has not vet determined detection limits for these compounds.

Date Received: August 18, 1988 Date Reported: November 29, 1988 Work Order: 876 Job Number: 0R001

FOR: ES:Oak Ridge/Duluth ANGB

ATTN: Mr. Bill Hayden

Address:710 S. Illinois Ave. Suite F-103

Oak Ridge, TN 37830

Lab Number:	88081941	88081942
Sample No.:	DANGB2-MW41-SS3	DANGB2-MP41-SS2
	REEXTRACT	REEXTRACT
Date Sampled:	8-17-88	8-17-88
Time Sampled:	13:50	21:15
Date Extracted:	10-28-88	10-28-88
Date Analyzed:	11-01-88	11-02-88
Percent Moisture:	9	18

Compound	Detection Limits	ANALYTICAL (dry we		
	ug/kg	ug/kg	ug/kg	
2-Chlorophenol	330	ND	ND	
2-Nitrophenol	330	ND	ND	
Phenol	330	· ND	ND	
2,4-Dimethylphenol	330	ND .	hО	
2,4-Dichlorophenol	330	ND	ND	
2,4,6-Trichlorophenol	330	ND	ND	
4-Chloro-3-methylphenol	66Ø	ND	ND	
2,4-Dinitrophenol	1500	ND	ND	
2,6-Dichlorophenol	*	ND	ND	
2-Methyl-4,6-Dinitrophenol	1600	ND	ND	
Pentachlorophenol	1600	ND	ND .	
4-Nitrophenol	1600	D	ND	
Benzoic Acid	1600	ND	ND	
2-Methylphenol	330	ND	ND	
3- & 4-Methylphenol	330	ND	ND	
2,3,4,6-Tetrachlorophenol		ND	ND	
2,4,5-Trichlorophenol	330	ND	ND	

Sawa kurk Analyst

Laboratory Supervisor

^{*} EPA has not yet determined detection limits for these compounds.

B = Compound was detected in the blank.

		,					ċ			•	
ES JOB NO.	PROJECT NAME/LOCATION					Š	SOILS	AHA	SES		
OR001	Duluth ANGB/Duluth, Mn.	, ON						REQUINED	1	ant 10. Igineening–science	
SAMPLERISH (Signatura)		· 6		\		\			///	ABORATO	
12/1	Competent Stickers	CON-	_	3200	`\	\\		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Sork Bork	oou Bancroit Way Borkeley, CA. 54710	**
		T	<u>~</u>	00	ō,	9	10		/ /		
DATE TIME	SAMPLE DESCRIPTION	TAINERS	OP HS	OPHS	~ (C.)	AS	5.48°			REMARKS CO 10000	1
8/17/88/11:25	DANGO 2MW41-551			×	1 .	×	\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	 	52,6010	15 Jour 13 4 6.11 A	025
51:21 88 27 18	ELIZISSIZIS DANGIB ZIMWYI-SSZ	/	. `	حح	2	i=	1 2		38	1	1
2112189 8:40	3 117/89 8:40 DANGB 2 MP41-55 1			X	7.1	ע	÷-		2	881940 %	_
05:1 13/01/8	1:50 DANGB 2 MW41-553	,		×	>:		2,		2 1	981981 "	
9/ग्रेष्टि वः 15व	9/17/169:15a 5ANGB, 2 MP41-552	,		×	7	,	1	<u> </u>	-	994949 11	,
8/17/86 12:15	SIMBS 12:150 DANGB ZMW41 . 552	_	×			<u> </u>	_	<u> </u>		381929	<u> </u>
2080 38/17/8	8/17/18 0900 DANGB 2 MP41 SS 2	1	×				-	<u> </u>		choise	<u> </u>
8/12/57 8:30	DANGB 2 MP41 551	/	×		 		 	<u> </u>		861940	
54:2188/218	5/17/88/12:45 DANGB 2 MW 41 553	1	×			 	-			06:1001 06:1001	
ह्यामा है। १५	8/17/18 11:25 DAVGR ZMW41-551	/	X					<u> </u>		86/88	
S/13/84 4:00 P	DAN683-55-D5	1	×								14:55
d+0:4 18/1/3	091683-55-65	/	×	بز	۶.	ж.	×		F. 11.	700 1 7476 1646 1 Oct	1:
9/12/84 4:23 p	-55	/	×						150	881944	<u> </u>
3/17/58 4:25P	PANE 33 - 55-65	/	人	74"	٤	راخد	ه ^ه ر.		11	730	1
	1411 8-				-				Andrews in the second s		100
Relinquished by: (Signature)	(Signature) Date/Time Received by: (Signa	sture)	Relinquished	Jahe		181	by: (Signature)	13	Date/Time	Received by: (Signature)	
1/2/1/2	de 8-7250 1725		•								
Relinquished by: (Signature)	(Signature) Date/Time Received for Labora	atory by:	Oac	Date/Time	•	= =	Remarks 1 4 C L	- F.	refe Le	Pil intert DANGES.	\$ - Q
	BEER Duratur)	5.10.88	K 1.3 2.1	- :	•			, I	\$	•••
all and late let	Inn. Orininal Assembanias Chimman C.										

Distribution: Original Accompanies Shipment, Copy to Coordinator field files

State the state of

Libral Sa .

SEMÍVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Job No.:

Client: ES! DAK RIDGE

Attn: Address:

Project: DuluT1+

TICs Found: 14

Project No: BLANK

Sample Matrix: 50/4 Conc. Unit: MS/ris Work Order No: 876 Lab Sample ID: BLANK

Lab File ID: # 5797

Date Received: 7-26-88 Date Analyzed: 10/3/38

Date Reported: -Dilution Factor:/ % Moisture:—

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
		_1		-
	Unknown	3.42	630	
	Unknown	3.46	530	
	Unknown	3.75	1200	
	Unknown	4.42	530	
	Unknown	4,55	1200	
	Unknown	4.89	530	
	Unknown	5.09	2400	
	Unknown	5,30	17000	
	Unknown	6.39	330	
	Unknown hydrocarbon	6.93	430	
	Unknown hydrocarbon	6.99	230	
**************************************	Uhknown	21.73	330	
	Unknown	<i>≥8.8</i> 3	400	
	Unknown	35.09	8700	
	!			
			i	
	1			
· 				
			<u> </u>	
	The second secon			
	1			
				and the second s
,			Harry and	
	0404	<u></u>		

2461

77-73:501

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY ÎDENTIFIED COMPOUNDS

Job No.:

Client: Attn:

Address:

Project:

DULUTH

7 TICs Found: 9

Project No:

Sample Matrix: So:

Conc. Unit: mg/kg

Work Order No. 876 Lab Sample ID: BLANK Book 4 pg 16

Lab File ID: E 6065

Date Received: -

Date Extracted: 10-28-88

Data Analyzed: 11-2-88

Data Reported:

Dilution Factor: 1

% Moisture: ___

CAS WURBER	COMPOUND TAKE	RI	EST, COMO.	2
1. 2. 3. 4. 5. 6.	Curknown curknown curknown alkene mw. 98 curknown	3.20 3.51 4.10 4.29 4.49 4.49 4.94	430 700 876 1000 700 14000 200	
9		35.07	270	
15.				
23.				

2462

1:2

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

EPA	SAMPLE	NO.
DANG	Ba-	!

Lab Name: Engineering Science contract	:
Lab Code: Case No.: 876 SAS No.	: SDG No.:
Matrix: (soil/water) Soil	Lab Sample ID: 8808/938
Sample wt/vol: 30 (g/mL) qm	Lab File ID: <u>E5798</u>
Level: (low/med) low	Date Received: 8/18/88
Moisture: not dec. 18.8 dec	Date Extracted: 8/26/88
* Moisture: not dec. 15.6 dec	Date Analyzed: 10/3/88
GPC Cleanup: (Y/N) N pH:	Dilution Factor:/

Number TICs found: 17

CONCENTRATION UNITS: Kg (ug/L or ug/Kg): xxg/Kg

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	unknown	4.49	17,000	
2		4.55	240	
3.		1 4,96	5000	
4 •			3200	
5		1_5,32_	15,000	
D		1 6.33	790	
/·		6.45	208	
8.		23.97	1 200 1	
9. 57-10-3	Hexadesanoic acid	1 24,16	990	
10.	unknown	1 28.65	1 <u>280</u>	
11.		29.5° 32,19	55°	
12.		1 32,19	360	
13.		1 33,76	482	
44 ·		34,5)	300	
15.		1 35,46	22 600	
10.		1 36.71	240	
1/·		1 40,87	700	
16.			1	
19.				
20				
21.				
22.				
23.				
24.				
25.				
26.				
27.		i		
28.	Í	i		i
29.	1	i		
30.	1	i	i ———	i ——

FORM I SV-TIC

1/87 Rev.

IF SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

	DAN632 -
-	mw41-552

TEN	TATIVELY IDENTIFIE	ואטכישמים ט	JS	DAMORGA	•
Lab Name: Engine	ering Science	Contract:		mw41-5	52
Lab Code:	.Case No.: 876	SAS No.:		SDG No.:	
Matrix: (soil/water	1) <u>Soil</u>	:	Lab Sample	ID: <u>8808193</u>	9 Rex
Sample wt/vol:	30 (g/mL) gm	,		D: 5056	
Level: (low/med)	low	1	Date Recei	ved: 8-18-8	8
* Moisture: not dec	e. 18.0 dec	1	Date Extra	cted: 10-28-1	<u>88</u>
Extraction: (SepF/	(Cont/Sone) <u>Sen</u>	<u>c</u> 1	Date Analy	zed: 11/21/	88
GPC Cleanup: (Y/)	() <u>W</u>	. 1	Dilution F	actor: /	
Number TICs found:	: <u>30</u>	CONCER (UG,/L)	TRATION UN	ug/Lg	
CAS NUMBER	KA CHUNTAGO	<u> </u>	PT	EST. CONC.	Q
2. 71-43-2	benzeus		3.26	40€ 410	
3.	unknown		3.33	850	
4			1 426	20c	
5	<u> </u>		1 4, 40	240	!

CAS NUMBER	CONTROUND NAME	PT	EST. CONC.	Q ;
3.	benzeni unknown	3.26 3.33 3.85 9.26	400 € 410 850 200	
6. 79-80-5 7. 8. 127-18-4	1,1,2-trichbroethans unknown tetrachloreethere unknown	4,50 4,50 4,94 5,14 5,28	240 440 850 640	
10. 11. 12.		5.79 7.03 29.75 30.06	16000 550 1800 320	
14 15 16. 17.		31,70 33,37 34.66 35.44	2/0 38: 6/0 20 v	
18. 19. 20.		36,46 40,89 4,56	1200 610 200	
22. 23. 24. 25.				
26. 27. 28. 29.				
30				

FORM I SV-TIC

1/87 Rev.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

1 DANGB2-	
m741-55/	

Lab Name: Engineering Science contract	:
Lab Code: Case No.: 876 SAS No.	
Matrix: (soil/water) <u>Soil</u>	Lab Sample ID: 88081940
Sample wt/vol: 30 (g/mL) gm	Lab File ID: E58/2
·	Date Received: 8-18-88
Level: (low/med) low 31/89 Moisture: not dec. 13.4 dec.	Date Extracted: 8-26-88
Extraction: (SepF/Cont/Sonc) Sonc	Date Analyzed: 10/5/88
GPC Cleanup: (Y/N) M pH:	Dilution Factor: /

concentration units: (ug/L or ug/Kg)

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1	un Known - mol. wt. 84	4.11	350	
2	1 unknown	4.41	-6200	
3	1	1 4,87	3200	
4		1 5.27	15,000	
5		1 6,29	500	
6		6.45	1100	
7		1 6.63	3/0	
8		6.95	1 150	
9.	1	23.49	196	J
10. 57-/0-3	Hexadecansic acid	24.13	960	l
11.	1 in Known	26.52	190	l
12.		128.81	420	
13.		29.20	1100	1
14.		30,97	460	i —
15		32.16	230	i
16		1 33,12	190	
17	1	33.7)	230	i
18		39.46	190	i
19	1	35,35	15000	i
20	1	- 		i
21.	1	- ¦		i
22.	1	-		i —
23.		-		;
24.		-		i
25.		-	·	i
26		-		i
27		-		¦
27.	1	-	\ <u></u>	¦
28.		-		!
29. 30.		_!		!

FORM I SV-TIC

1/87 Rev.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Job No.:

Client: ES. OAK RIDGE

Attn: Address:

Project: Duluty

TICs Found:

Project No: Dan682-mw41-553

Sample Matrix: 5014 Conc. Unit: 49/kg

Work Order No: 876 Lab Sample ID: 8808/94/ REEXTRACT

Lab File ID: E6056
Date Received: 8-18-88
Date Extracted: 10-28-88

Date Analyzed: "/1/88

Date Reported:
Dilution Factor: /
% Moisture: 9

CAS NUMBER	COM POUND NAME	RT	EST. CONC.	Q
	Unknown	3,21	3700	
	Unknown	3,51	400	
	Unknown	3,66	180	
	11,2- triplibroethane	3.7		
	Unknown	4.13	400	
	(Inknow)	4.30	550	
	Unknown	4,51	290	
34 54 5	Unknown	4.79	4400	·
79-34-5	1,1,2,2 - tetrachloro ethane		2400	
	Unknown	6.19	700	
	Unknown	25,58	150	
+- 	Unknown	25.81	180	
	Unknown	28,48	2500	
	Unknown hydrocarbon	28.79	180	
	Unknown'	. 32.86	2.50	
			ļ	
				·····
	, and the second			
· · · · · · · · · · · · · · · · · · ·				
		· · · · · · · · · · · · · · · · · · ·		···

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET TENTATIVELY IDENTIFIED COMPOUNDS

Job No.:

Client: ES: OAK RIDGE

Attn: Address:

Project: DULUTH

TICs Found: >

Sande Project No: DANGB2-MP41-552

Sample Matrix: 30/6 Conc. Unit: M5/65 Work Order No: 876

Lab Sample ID: 88081942 re-extrad

Lab File ID: £6062 Date Received: 8-18-88 Date Extracted: 10-28-88 Date Analyzed: 11/2/88

Date Reported:
Dilution Factor: /
Moisture: 17.6 18

3/1/89

***			<u> </u>	 -
AS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
	Unknown	3.07	900	
	Unknown	4.41	240	
······································	Unknown	4.61	1400	
	Unknown	4.96	23000	
	Unknown	6.12	610	
	Unknown	19,47	1200	
	Unknown	28.48	970	
	Unknown	34,33	2400	
	<u> </u>			
	i			
				
		!		
		1		
		į		
		; · · · · · · · · · · · · · · · · · · ·		
	and the same of th	eriaminan (n. 1984) eriami	, to 1/2	-
		ì		
		The second section of the second	***************************************	
	0.40	i,		

2467

CASE NARRATIVE

QUALITY CONTROL RESULTS SUMMARY SAMPLE NO(S): 88081877-88081879 SAMPLE NO(S): 88081883-88081890 SAMPLE NO(S): 88081938-88081942 SAMPLE NO(S): 88082000-88082002

The results obtained for the laboratory control sample (LCS) analyzed with these samples for the analytes Cadmium, Chromium and Barium exceeded the recommended EPA recoveries. All data associated with this batch was closely inspected and no analytical problems were found. The initial and continuing calibration verification standards and blanks and precision and accuracy recoveries were within acceptable limits with the following exceptions:

Cadmium spike recoveries and precision exceeded acceptable limits. The spike sample was followed by an analytical spike as required by laboratory standard operating procedure. The results of the analytical spike recovery for Cadmium were within acceptable ranges.

THE PERSON NAMED IN

TOTAL STATE OF

Late of the late of

THE PERSON NAMED IN

The same of

A CASE A SA

State Children

安全などのである か

P. SPANISH AND

see thanks.

春のからから 日本

Cappinguine

Partinganute of

METALS

OR001.02 Job No.: ES Oak Ridge Client:

710 S. Illinois Avenue Bill Hayden Address:

Attn:

37830 Oak Ridge, Tn. Suite F-103

10-13-89 08-15-88 mg/KG Soil Dilution Factor: Date Reported: Date Received: Sample Matrix: QC Report No: conc. Unit: %Moisture:

ICP-S-0027-88

Duluth ANGB Project:

Laboratory Supervisor Approval:

88081883-88081890 88082000-88082002 Doc Report for Laboratory Sample No(s): 88081877-88081879, 88081938-88081942,

Notes	
Y PR	106
Spikekecovery SR SSR	221 40 2 275 106
Spike	C C F
SA	(
Q.	(
Duplicate C2 RPD	,
2	
Blank	
Anal Blank Method	
Date Prep	
Date Anal	
AnalyteLaboratorySample Nos. Duplicates Spike	

118 150 14.6 47.0 20.9 6.31 40.2 22.1 5.53 **777** 51* ω ω 10.6 22.7 37.2 40.2 6.31 20.9 <0.5 <1.0 <20 6010 6010 6010 9-09-88 88-60-6 9-00-6 9-18-88 9-16-88 9-16-88 88081879 88081879 88081879 88081879 Cadmium 88081879 Chromium88081879 Barium

Z

on a dry-weight basis. If % moisture is reported, results are presented See Legend attached. NOTE:

Calculated = Not Applicable Detected Not Not # 11 NC NA Concentration One 11 100 × c2)/5 2 (C1 + CJ Relative Percent Difference (RPD)

Spiked Sample Result 11 11 SSR C2 Percent Recovery (PR) = $SSR - SR \times 100$

SA

Spike Added (Concentration) Sample Result 11 \mathbf{SR}

QUALITY CONTROL RESULTS SUMMARY METALS

OR001 Job No.: ES Oak Ridge

client:

Attn:

710 S. Illinois Avenue Bill Hayden Address:

37830 Oak Ridge, In. Suite F-103

AAF-S-0026-88 9-17-88 9-17-88 10-10-88 mg/KG Soil Sample Matrix: Date Received: Date Prepared: Date Reported: QC Report No: Conc. Unit:

Dilution Factor:

15.0 %Moisture:

> Duluth ANGB Project:

QC Report

88081938-88081942 for Laboratory Sample No(s): 88081901-88081906, 88082000-88082002

Laboratory Supervisor Approval:

Notes

PR

SSR

SA

RPD

SpikeRecovery

z

68

9.88

5.69

5.88

0

79

8.59

4.90E

4.70

S

 \Box Blank Method Anal Date Anal Laboratory Sample Nos. Spike Duplicates Analyte

Duplicate

10-03-88 9-21-88 88081902 88081902 70 88081905 Arsenic₁₀ 88081902 Lead

<5.0E 5.69 <5.0E 5.69 <1.0 <0.5 0907 7421

a dry-weight basis.

o C

X 100

- C2

 c_1

Relative Percent Difference (RPD)

ΙΈ

NOTE:

(c1 + c2)/2

% moisture is reported, results are presented

= Not Applicable Calculated Detected = Not = Not NC ND NA

> Concentration Two Concentration One II 11 C2

Spiked Sample Result 11 SSR

Sample Result Ħ \mathbf{SR}

x 100

= SSR - SR

Percent Recovery (PR)

SA

Spike Added (Concentration)

. . . .

= Not Applicable

If % moisture is reported, results are presented on a dry-weight basis.

Calculated

Detected

= Not = Not

NC

Spike Duplicate

|| ||

X 100

MSD

(MS + MSD)/2

MS - MSD

11

Relative Percent Difference (RPD)

NOTE:

Spike Sample

Spike Added (Concentration)

Sample Result

|| ||

SR

Percent Recovery (PR) = $\frac{SSR - SR}{SSR} \times 100$

SA

Topic Control of the

Treasing and

Partition Park

Subtratification of

(Antiquetary)

は一次では

S. Allendar

THE STATE OF THE S

है जिल्लाहर है

AND PROPERTY.

CHAPTER SEC.

Sand himself

(other the)

California Cal

Spinister, or

A STATE OF S

The state of the s

TPH-S-0051-88

Notes

RPD

PR

MSD

PR

MS

SA

SR

Blank

Method

Anal

Laboratory Sample No.

88081938-88081942

for Laboratory Sample No(s):

QC Report

Duluth ANGB

Project:

88081966-88081977,

880821.02-88082104

13

100

1600

86

1400

1400

200

<100

418.1

88081967

2471

Laboratory Supervisor Approval:

9-26-88

29.3

Dilution Factor:

%Moisture:

Date Reported:

37830

oak Ridge, In.

Suite F-103

Address:

710 S. Illinois Avenue

ES Oak Ridge

OR001

Job No.:

client:

Attn:

Bill Hayden

Date Analyzed:

8-19-88 9-14-88 9-15-88

Date Received Date Prepared

Conc. Unit:

mg/KG

Soil

Sample Matrix:

OC Report No:

QUALITY CONTROL RESULTS SUMMARY ENVIRONMENTAL QUALITY PARAMETERS

PETROLEUM HYDROCARBONS

89-DULU0056 1

QUALITY CONTROL RESULTS SUMMARY VOLATILE ORGANICS EPA 8010/8020

VGC-S-0041-88

OR001 Job No.:

ES Oak Ridge

Bill Hayden client:

710 S. Illinois Avenue

Address:

Attn:

Suite F-103

37830 Oak Ridge, Tn.

Duluth ANGB Project: Laboratory Sample No(s).: QC Report for

88081898-88081900, 88081904-88081906 88081954-88081962 88081938-88081942,

Laboratory Supervisor Approval:

10-07-88

15.8

Dilution Factor:

& Moisture:

08-30-88

NA

08 - 18 - 88

Date Received: Date Prepared: Date Analyzed: Date Reported:

ug/KG

Soil

Sample Matrix: OC Report No:

Conc. Unit:

Laboratory Sample No.	Compound	SA	SR	MS	PR	MSD	PR	RPD	ES RPD	QC Limits %Recovery
	Halocarbons: 8010									
88081938	1,1-dichloroethane	11.9	ND	11.2	94	9.3	78	19	20	58-124
	Trichloroethene	11.9	NO	10.8	91	10.2	98	9	16	75-110
2	Chlorobenzene	11.9	ND	11.2	94	11.4	96	7	21	71-125
Arom	Aromatics: 8020									
88081938	Benzene	11.9	ND	10.2		6.6	83	m	26	75-123
	Toluene	11.9	2.1	11.6	80	11.6	80	0	16	79-115
	Chlorobenzene	11.9	ND	10.3		8.6	82	Ŋ	24	82-112
				**************************************					-	

% moisture is reported, results are presented on a dry-weight basis. NOTE: If

x 100 + MSD)/2 MS - MSD (MS II Relative Percent Difference (PR)

Spike Sample Duplicate Spike Sample II WSD = MS

x 100

SR

or MSD)

(MS

11

(PR)

Percent Recovery

SA

Not Applicable Calculated Detected

NA NC ND

Not Not

11 11

Sample Result II \mathbf{SR}

Spike Added (Concentration) 11

89-DULU0105 1

Middlings and

N PRINCES

A SAME IN

Delitable

helicitated higher

F-ASTILISSEM-S

一种种种的

TOWN THE PERSON NAMED IN Santandaha.

Total Park **公司**

The state of the s

Commission

a Calabrata a

Berlinselling.

METHOD BLANK SUMMARY EPA 8010/8020

> OR001 Job No:

Client:
Attn:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Address:

Oak Ridge, Tn.

Duluth ANGB

Project:

37830

ug/KG 10-10-88 Soil Conc. Unit: Date Reported: Sample Matrix:

Laboratory Supervisor Approval:

Inclusive Sample Nos.	88081954-88081959 88081938-88081940	88081941-88081942	
CRDL	0.25	0.25	
Conc	2.5 0.5	2.7	
Compound (HSL, TIC or Unknown)	Dichloromethane Chloroform	Dichloromethane	
CAS Number	75-09-2 67-66-3	75-09-2	
Instru- ment ID	Carbo- pack	Vocol	
Instru- Fraction ment ID	VGC	AGC	
Date Analyzed	8-59-88	8-25-88	
File ID	31	2473 5	

CONTROL RESULTS SUMMARY EPA METHOD 8270 QUALITY

BNA-S-0041-88

08-26-88 10 - 03 - 88 11-29-88

NA NA

Dilution Factor:

Moisture:

08-18-88

Date Received: Date Prepared: Date Analyzed: Date Reported:

Conc. Unit:

ug/KG Soil

Sample Matrix:

QC Report No:

OROOL Job No.: ES Oak Ridge Bill Hayden Client: Attn:

710 S. Illinois Avenue Address:

Suite F-103

37830 Oak Ridge, Tn.

Duluth ANGB Project: for Laboratory Sample No(s): QC Report

88081898-88081906 88081938-88081942

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit %Recovery
B/N	1,2,4-Trichlorobenzene Acenaphthene	3970 3970	UN UN	622	16*	753	19*	19	23	38-107 31-137
Laboratory Sample #	Laboratory 2,4-Dinitrotoluene Sample # Pyrene	3970 3970	QN QN	1750 1810	4 4 4 0	979	25 *	57* 25	47 36	28-89 35-142
88081838		3970 3970	ON ON	1710 82.1	43	1410	36*	19 62*	38	41-126 28-104
	1	7940	ON	8770	110*	10100	127*	14	47	17-109
Laboratory	Laboratory 2-Chlorophenol	7940	NO	2280	29	2280	29	00	20	25-102
Sample # RRO81938	4-Chloro-3-Methylphenol	7940	O Z	4350	55	1270	16*	110*	33	26-103 11-114
2000										

% moisture is reported, results are presented on a dry-weight basis. ΙĘ NOTE:

Spike Sample 11 11 MS MSD X 100 (MS + MSD)/2MS - MSD u ¹ (RPD) Relative Percent Difference

Spike Duplicate Sample Result II \mathbf{SR}

Spike Added (Concentration)

NA = Not Applicable

Calculated Detected

NC = Not = Not

ND

= (MS or MSD) -SR x 100 SA

Percent Recovery (PR)

89-DULUO60R

QC-FRM1S

-

· salar

F LYBY SLOW

P KRAND KANAT

W. Sand

Chale by Manch 15'4

Threshold and the state of the

THE PROPERTY OF

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0041-88B

08-26-88 10-25-88 11-29-88

NA

Dilution Factor:

%Moisture:

Date Reported:

ug/KG Soil

Sample Matrix:

QC Report No:

Date Received: Date Prepared: Date Analyzed:

Conc. Unit:

OR001 Job No.: ES Oak Ridge Bill Hayden client: Attn:

710 S. Illinois Avenue Address:

Suite F-103

37830

Oak Ridge, Tn.

Laboratory Supervisor Approval:

Duluth ANGB Project: for Laboratory Sample No(s): 88081898-88081906 QC Report

88081938-88081942

:										
Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA RPD	QC Limit & Recovery
	1,2,4-Trichlorobenzene	3330	ND	14.3	<1*	273	*8	NC*	23	38-107
B/N	Acenaphthene	3330	QN	757	23*	977	*62	25*	19	31-137
Laboratory	Laboratory 2,4-Dinitrotoluene	3330	ND	1740	52	2000	09	14	47	28-89
Sample #	Pyrene	3330	ND	1380	41	1470	44	4	36	35-142
Blank A	N-Nitroso-di-n-Propylamine	3330	ND	957	*62	1140	34*	17	38	41-126
24	1,4-Dichlorobenzene	3330	ND	ND	NC*	92.7	28	NC*	27	28-104
7:	Pentachlorophenol	6670	ON	2220	33	3080	46	32	4.7	17-109
ACID	Phenol	0299	ND	1990	30	2710	41	31	35	26-90
Laboratory	Laboratory 2-Chlorophenol	0299	QN	1170	18*	1980	30	51*	20	25-102
Sample #	4-Chloro-3-Methylphenol	0299	ND	3170	48	3630	54	13	33	26-103
Blank	4-Nitrophenol	0299	ND	2580	39	3030	45	16	20	11-114
NOTE: If	If % moisture is reported, results a	ilts are	presented	nted on a	1	dry-weight basis	sis.			

Spike Duplicate = Spike Sample 11 MSD MS X 100 + MSD)/2 - MSL MS (MS Relative Percent Difference (RPD)

Sample Result 11 11 SR

 $(MS \text{ or } MSD) - SR \times 100$

11

Percent Recovery (PR)

Spike Added (Concentration)

NA = Not Applicable

Calculated

Detected

Not = Not

11 NG NG

89-DULU0609 1

CASE NARRATIVE
QUALITY CONTROL RESULTS SUMMARY
QC REPORT NO(S): BNA-S-0041
QC REPORT NO(S): BNA-S-0041B
WORK ORDER NO: 860

Analysis of matrix spike samples resulted in at least one outside of EPA QC recovery limits for trichlorobenzenes, dinitrotoluene, nitrosodipropylamine, pentachlorophenol and chloromethylphenol. In addition, RPD's for dinitrotoluene, dichlorobenzene chloromethylphenol were above EPA QC limits. Analysis of blanks resulted in high RPD's for di trichlorobenzenes, acenaphthene, nitrosodinpropylamine and chlorophenol that were outside of EPA QC limits. The data associated with these analyses were closely examined. analytical errors were found.

METHOD BLANK SUMMARY

THE PERSON NAMED IN

CST TOTAL

OR001 Job No: client:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Oak Ridge, Tn. 37830 Attn: Address:

Sample Matrix: Conc. Unit: Date Reported:

Soil ug/KG 12-08-88

Laboratory Supervisor Approval:

ANGB
Duluth
Project:

Inclusive Sample Nos.	88081938-88081942 88081898-88081906	
CRDL	I	
Conc	l	
Compound (HSL, TIC or Unknown)	None Found	
CAS Number	ı	
Instru- ment ID	8	
Instru- Fraction ment ID	BNA	
Date Analyzed	10-03-88	
File ID	E5797	2477

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0045-88

08-18-88 10-28-88 11-02-88 12-08-88

Date Prepared:

Date Analyzed

Date Received

Conc. Unit:

ug/KG Soil

Sample Matrix:

QC Report No:

OROCI Job No.: ES Oak Ridge client:

710 S. Illinois Avenue Bill Hayden Address:

Suite F-103

37830 Oak Ridge, Tn.

Duluth ANGB Project:

Laboratory Supervisor Approval:

Dilution Factor

%Moisture:

Date Reported:

for Laboratory Sample No(s): QC Report

88081889, 88081939Re, 88081887Re,

88092146, 88092147Re, 88092148, 88081879, 88081693Re-88081694Re 88081941Re, 88081942Re, 88091955Re-88091956

47

7 2				•						
3									EPA	QC Limit
Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	RPD	*Recovery
	1.2.4-Trichlorobenzene	4060	ND	2370	58	2840	70	18	23	38-107
N/a	Acenaphthene	4060	QN	3660	90	3980	86	ω	19	31-137
Lahoratory	Taboratory 2.4-Dinitrotoluene	4060	QN	5040	124*	5980	147*	17	47	28-89
Sample #	Dyrene	4060	QX	4880	120	5370	132	10	36	35-142
RANG1942Re	88091942Re N-Nitroso-di-n-Propylamine	4060	ND	5410	133*	5930	146*	6	38	
	1,4-Dichlorobenzene	4060	ND	1460	36	1580	39	ω	27	28-104
	Dont-ahlo-onhonol	8130	CIN	10600	130*	11300	139*	9	47	17-109
, t	Pencaciitoropiienor	2130	ž	6140	76	6910	85	12	35	26-90
Taboratory	ACID FILEHOL Taboratory 2-Chlorophenol	8130	C Z	5840	72	6580	81	12	20	25-102
Laboratory	4-Chloro-3-Wethylphenol	8130	Q	10400	128*	11800	145*	13	33	26-103
S8091942Re	88091942Re 4-Nitrophenol	8130	QN	7320	90	5120	63	35	20	11-114

If % moisture is reported, results are presented on a dry-weight basis NOTE:

See Case Narrative attached.

= Not Applicable Calculated = Not NC ND Spike Duplicate Spike Sample 11 11 MS MSD X 100 (MS + MSD)/2MS - MSD 11 Relative Percent Difference (RPD)

= (MS or MSD) $-SR \times 100$ Percent Recovery (PR)

Detected Not 11

Spike Added (Concentration) Sample Result

QC-FRM1S

SAN THE STATE OF

Statuters.

Caprolling ...

では見ること

QUALITY CONTROL RESULTS SUMMARY EPA METHOD 8270

BNA-S-0045-88B

10-28-88 11-02-88 12-08-88

Date Prepared:

Date Analyzed:

Date Received:

Conc. Unit:

NA

Dilution Factor:

%Moisture:

Date Reported:

ug/KG Soil

Sample Matrix:

QC Report No:

OR001 Job No.:

ES Oak Ridge Bill Hayden client: Attn:

710 S. Illinois Avenue Address:

Oak Ridge, Tn. Suite F-103

37830

Duluth ANGB Project: for Laboratory Sample No(s): 88081887Re, QC Report 479

88081693Re-88081694Re 88081942Re, 88091955Re-88091956 88092146, 88092147Re, 88092148, 88081879, 88081941Re,

Laboratory Supervisor Approval:

Fraction	Compound	SA	SR	MS	PR	MSD	PR	RPD	EPA (Qc Limit &Recovery
B/N Laboratory Sample # Blank	1,2,4-Trichlorobenzene B/N Laboratory 2,4-Dinitrotoluene Sample # Pyrene Blank N-Nitroso-di-n-Propylamine 1,4-Dichlorobenzene	3330 3330 3330 3330 3330	ON ON ON ON ON ON ON ON ON ON ON ON ON O	2600 2630 2870 3130 3430 2130	78 79 86 94 103	2300 2200 2900 2930 2830 1800	69 66 87 88 85 54	12 18 1 7 19	23 19 47 36 38 27	38-107 31-137 28-89 35-142 41-126 28-104
ACID Laboratory Sample # Blank	ACID Laboratory 2-Chlorophenol Sample # 4-Chloro-3-Methylphenol Blank	6670 6670 6670 6670 6670		6520 3870 4200 6100 1590	98 58 63 91	6070 3240 3800 6170 990	91 48 57 92 15	7 18 10 1	47 35 50 33 50	17-109 26-90 25-102 26-103 11-114

a dry-weight basis % moisture is reported, results are presented on ΙĒ NOTE:

= Not NC = 1 Spike Duplicate Spike Sample 11 ĮĮ MS MSD 100 × (MS + MSD)/2MS - MSD 11 Relative Percent Difference (RPD)

(MS or MSD) -SR x 100

li

Percent Recovery (PR)

Sample Result

NA = Not Applicable

Calculated

Not Detected

Spike Added (Concentration)

SR

QC-FRM1S

CASE NARRATIVE

OUALITY CONTROL RESULTS SUMMARY

QC REPORT NO.: BNA-S-0031-88
QC REPORT NO.: BNA-S-0031-88B
QC REPORT NO.: BNA-S-0045-88
QC REPORT NO.: BNA-S-0045-88B

Analysis of duplicate matrix spike samples for this batch showed one recovery and five RPD's higher than EPA QC limits. A pair of spiked blanks were analyzed and the results showed the laboratory to be in control.

Analysis of samples 88081692 and 88081694 gave recoveries of two of the three base neutral surrogates that were much lower than EPA QC limits. These samples were re-extracted on 10-18-88, past the expiration of the extraction holding time. Analysis of these re-extractions showed good surrogate recoveries. The only difference in results was that dibutylphthalate was found in the original analysis and not in the reanalysis. The results of the second analysis are enclosed.

Matrix spikes that were analyzed with the re-extraction were found to have low recoveries of dichlorobenzene and high RPD's for di and trichlorobenzenes and acenaphthene. Spiked blanks were analyzed. The results showed the laboratory to be in control.

METHOD BLANK SUMMARY

The Charles

が対象を

And the second second

Commence of

And address

Taken a

THE PARTY OF

1 一大田できて

* 大大はおおいま

the North Change

funktikus

1 Man Sections

I of a list of the state of

での自然をはない

OR001 Job No: Client:

Attn: Address:

ES Oak Ridge Bill Hayden 710 S. Illinois Avenue Suite F-103 Oak Ridge, Tn. 37830

ug/KG 12-12-88 Soil Conc. Unit: Date Reported: Sample Matrix:

Laboratory Supervisor Approval:

Duluth ANGB Project:

Inclusive Sample Nos.	88081939Re 88081941Re, 88081942Re 88081955-88081956	88092146Re-88092148Re	
CRDL	ı		
Conc	ı		
Compound (HSL, TIC or Unknown)	None Detected		
CAS Number	1		
Instru- ment ID			
Instru- Fraction ment ID	BNA		
Date Analyzed	11-21-88		
File ID	S0564 1	2481	

SEMIVOLATILE METHOD BLANK SUMMARY

Job No.:

Client: Attn: Address: Work Order No.:

Lab Sample No.: 64-22Lab File ID: 50564

Matrix: Soi / Level (low/med):

Date Analyzed: 11-21-88
Time Analyzed: 18:40

Instrument ID:
Date Reported:

Project: Dulth

This Method Blank applies to the following samples, MS and MSD.

Sample Number	Lab Sample ID	Lab File ID.	Date of Analysis
ANGB-2MW41-552	88 681939 Rex	SUSES	11-21-88
ANGB-BG-MW42 552 7-8	88681968 Rex 1	50566	('
ANGB - BG - MW42 551 0-1	88081970 Ex1	50567	()
9NGB -BG-MW42-553 14.5-15.5	88681971 Per 1	50568	1.
1-G · 225 - ADUA	88081975 Rix	50569	1/
ANGB -355 - EO	88081976 Rex	50617	12-1-88
	,		
-			

GC/MS TUNING AND MASS CALIBRATION

Decefluorocriphenylphosphine (DFTFP)

iase No. AD-76

Contractor ENG SCI(9/7/83) Contract No. 99-99-99

Instrument ID #1

Date / Time 10/04'88 17:58

Lat 10 -0104E::03

Data Release Authorized By: _

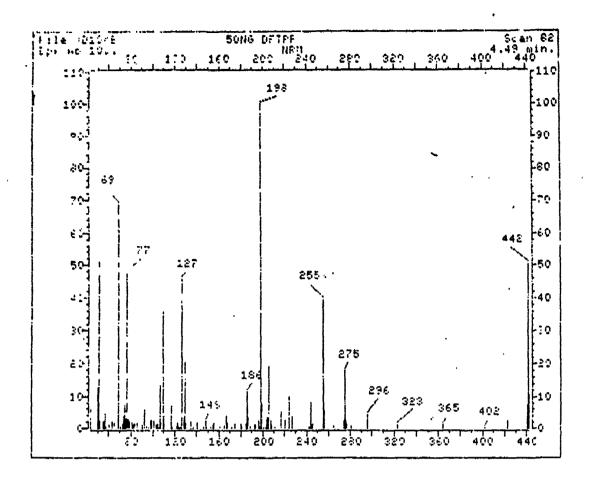
m, I	ION ABUNDANCE CRITERIA . *		*RELATIV	E ABUNDANCE
51	, 30 0 - 60.0% of mass 19:	 	51.53 OF	
ιð	less than 2.0% of mass of	1	0.00 NK	().(0, #1
68	mass 69 relative acundance	1	68.73	eSa.
	les: than 2 0% of mass 39	1	0.00 OK	(0.00) #1
127	; 4c.0 - 60.0% of mass 198	ĺ	45.71 CK	
197	iess than 1.0% of mars 198	i	.55 OK	
:7ċ	base peak, 100% relative abundance	İ	100.00 OK	
190	5.0 - 9.0% of mass 198	ĺ	1 7.57 GK	
275	10.1 - 30.0% of mass 198	l	17.92 0).	
ióf.	greater than 1.00% of mass 198	Ì	1.33 OK	
441	I present, but less than mass 443		7.49 03	
	greater than 40.0% of mass 198	İ	50 57 DK	
	17 0 - 27 0% of mass 442	j	10.56 OK	(29.88) \$2

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLAHKS AND STANDARDS. #I - Value in parenthesis is % sess 59.

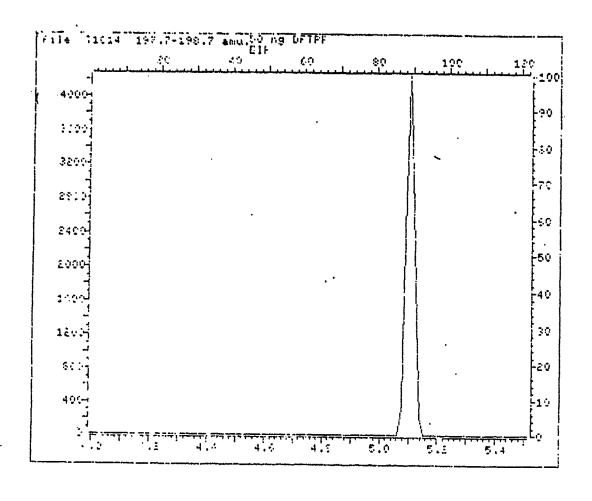
#2 - Value in parenthesis is % mass 442 c

iSHMPLI IDI	LA6_I0		TIME_OF_ANALYSI	51
SONG OF FF	->D1048	16/64/83		
60 my/ (std;	E5306		18:32	
10 "	ESB07		19.27	
25 "	E5803		20:21	
40	E5809		21.16	
80 .	E58/0		22.11	<u> </u>
130 "	E5811		23.05	
53081940	E58/2_	10/5/38	00.00	juse L
55081441	E5813		c o: 55	- SSOFT,
SYLY 1847RA!	E5815			1004 needs
83081859KA.	E5816			Not needs
88051942	E5817		3¶. 3B	_i~ssort,
88081898	E5818		4.33	_1 000_
				!
. i		1 1		1

FORM V



£:	editai	Scar #:	3.	? Retn.	time:	4.49			
m/2	int.		int	tu.' Z	Int.	m/z	Int.	tu/z	Int.
44.)	. 5 9:1			125 30	. 286	181.00	.7(2	2.6.93	3.772
50.10	11.617	85.5	1.40	125.96	.494	184.50	1.483	241.90	.546
51.10	0 51.535	65.05	1.571	127.00	45.708	166.00	11.472	242.90	.416
52.10	2.601	11.05	1.249	128.06	3.512	187.00	3.538	244.00	8.041
55.1	: 1.237	93 50	5.937	129.00	20.473	189.00	. 650	245.UÜ	1.14:
50.65	2.21;	95 90	.593	129.95	1.925	192.06	1.119	245.90	1.327
5 0	4.96	90.30	1.197	134.95	1.977	193.00	1.249	255.00	39.411
57 95	. 250	38.00	2.886	136.85	.546	195.00	2.419	256.00	5.463
٥i.05	5 1 119	98.90							
63.05	2.155	161.00	2 269	146.15	.546	198.00	100.000	274.00	2.315
6: .0:		103.00				199.00		275.00	
68.95	£3.730	103.90	1.015	148.75	. 286	2.1.20	, 494	27ć.00	2.353
70.95		105.63							
73.15	1.48	100.10	.494	155.05	1.093	203.95	3.362	281.05	.676
74.0	3.876	107.00	13.267	156.65	1.613	204.95	3.590	295.95	4.318
75.45	y.027	168.00	1.321	161.05	. 806	206.05	19.277	322.90	1.119
7t.0	3.0:8	110.00	36.082	163.05	.390	267.05	4.839	364.93	1.327
77.0		11:.00						451.80	.338
78.0		117.00		157.00		210.95		423.00	
79.(117.70					5.229		
79.9		122.00							
	4.475								
()	: .145	124.00		180.00				-	



Calibration Report

Title: ID 625 ACID AND BASE/NEUTRALS + EtPHENDL, DNSBP62-NO2-4-MEPH Calibrated: 821005 13:47

Éi	les: >E5807 RF	>E5808 RF	>E5809 RF	>E5806 RF	>E5810 RF	>E5811 RF	r.f	*****		
Compound	10.00	25.00	40.00	60.00	80.00	120.00	160.00	RKT	RF	ž RSD
N-Nitroso-Limethylamine	1.282	9 1.30934	1.16387	1.28439	1.27150	1.31362	.		1.27080	4.319
2-fluorophenol	1.220	2 1.36555	1.29860	1.43166	1.32490	1.24376	-		1.31409	5.954
bis(1-Chloroethyl)ether	1.539	0 1.55298	1.42389	1.40230	1.51748	1.63400	-		1.51173	5.703
Pheno l	1.720	7 1.85798	1.70181	1.81396	1.70812	1.67997	-		1.74714	4.089
Phenol-d5	1.636	3 1.65299	1.52273	1.47656	1.45815	1.35037	-	.940	1.51617	7.555
Aniline	1.264	11.74646	1.82728	2.07917	1.75875	2.26459	•	.923	1.82358	18.718
2-Chlorophenol	1.331	5 1.42889	1.34401	1.38140	1.36650	1.32742	-	. 955	1.36329	2.804
1,3-Dichiorobenzens	1.877	5 1.67566	1.52774	1.47832	1.46309	1.39216	-	.988	1.56915	11.373
1,4-Dichlorobenzene	1.804	3 1.61460	1.49113	1.41027	1.36462	1.26965	-	1.005	1.49247	12.890
Benzyl Chioride	•	-	-	-	-	٠,	-	-	•	-
Benzyl Aicohol	•	1.07669	.95368	1.02860	. 29415	.55886	-	1.287	.78240	43.575
1,2-Cioniorobenzene	1.653	8 1.59161	1.47142	1.46027	1.41154	1.30300	• -		1.48187	8.481
2-Methylphenol	1.221	14 1.33211	1.24334	1.29325	1.49116	1.88922	-	1.125	1.41182	17.894
3-6-4-Methylphenol	2.808	15 2.79628	2.64129	2.54969	2.65542	2.57616	-	1.180	2.67126	4.084
bis(2-chloraisopropyi)Etha	2.710	y 2.73748	2.51939	2.56333	2.59458	2.55323	•		2.61315	3.432
N-Kitrosc-Di-n-Propylamine	1.342	7 1.33241	1.29869			1.24439	-	1.165	1.31081	2.736
Hexach for oethane	.805	73424. 7	.68022	.65886	.64640	.59773	•	1.157	.68709	10.621
Dibromochioropropane	•	-	-	•	•	-	-	-	-	-
Nitrobenzene	.964	.70741	.61383	.65860	.59305	.87608	-	.838	.73556	20.523
Nitrobenzene-d5	•	-	-	-	•	•	-	•	•	-
2 rophenol	.228	.23503	. 22964	.24130	.23899	.23176	•	.914	, 23415	2.233
Isophorore	.987	.96022	.89631	.99675	.92841	.92721	-	.901	.94936	4.091
bis(2-Chloroethoxy)methane	. 648	.61579	.59212	.59970	.58247	,57399	-	.960	.60210	4.471
2,4-Dimethylphenoi	.326	.33727	.33000	.34939	.27882	.31641	•	. 952	.32307	7.528
Benzoic Acid	. 063	.21169	. 23618	.29494	.29613	.31793	-	1.011	.236?7	39.647
2,4-Dichlorophenol	. 253	29782. 29	. 30375	.30456	.28721	.27651	-	. 984	, 28719	6.877
1,2,4-Trichleroberzene	, 394	.36463	.34027	.33612	.32655	.30706	-	.992	. 34485	8.900
Naphtheiene	1.134	31 1.00322	.94919	.94353	.90437	.86858	-	1.005	.96720	9.675
4-Caloroaniline	.399	9 .45931	.45614	.49463	.47160	.43769	-	1.037	.45308	7.165
Hexach lorobutagiene	. 229	77 .20693	.18707	.20479	.18603	.16134	•	1.055	.19599	11.896
4-Chioro-3-Meti-ylphenol	.334	76 .38004	.36427	.38170	.33534	.32070	-	1.187	.35283	7.350
2-Methylnaphtha'ene	.629		.58955	.59732	.51248	.50409	•	1.182	.57109	8.893
Hexachlerocyclopentadiene	.338				.41702	.41738	-	. 852	.39980	7.974
2,4,6-Trichiorophenoi	.311			.32054				.873	.34737	9.544
2,4,5-Trishloropaensi	.449							.886		9.939
2-Fluorobiphemyl	_	•	-	•	-	-	- '	•	-	-
2-Coloronaphthalene	1.451	76 1.34076	1.26129	1.23291	1.17408	1.13963	-	.896	1.26674	9.044
2-Nitroan: line	. 645					.51050		.929		9.561
Dimethylphthalate		78 1.57746							1.32836	21.990

RF - Response Factor (Subscript is amount in mg/L)

RAT - Average Relative Retention Time (RT Std/RT Istd)

if - Average Response Factor

XRSC - Pércent hélative Standard Deviation

Calibration Report

Title: 10 625 ACID AND BASE/NEUTRALS + EtPHENOL, DHSBP62-H02-4-MEPH Calibrated: 86:005 13:47

Files	: >E580?	>E5808	>E5809	>E5806	>E5810	>E5811	•			
Compound	-RF 10.00	ŘF 25.00	ŘF 40.00	ŘF 60.00	RF 80.00	RF 120.00	RF 160.00	RKT	RF	9 210
	14:40	27,40	40.00	11	00.00	120.00	100.00	771	11	Géà \$
2, e-Dinitrotoluene	.34031	.36630	.32475	.32938	.30646	.30672	٠ ـ	.982	.32899	6.853
Acenaphthy ene					1.51125		•		1.65993	10.899
3-Mitroaniline	.65076					. 65070	•	1.007	.65718	4.115
2,4-Dinitrophenol	•`	.06779	.11110			.18842	•	1.026	.13830	34.984
Acenaphthene	1.28836	1.23342	1.13339	.98886		.96177	-		1.09782	12.880
Dibenzofuran	1.83281	1.75978	1.70582	1.54623	1.50046		-	-	1.63801	9.004
2,4-Dinitrotoluene	i 34316					.29950	-	1.053	.34323	12.575
4-Nitropheno:	•	.21326	.24737	. 27365	.28214	.30332	-	1.067	.26395	13.150
Fluorenë	1.44596	1.33863	1.24934	1.13888	1.07896		-		1.21752	12.735
Diethylphthalate					1.23856		-		1.49859	18.323
4-Chlorophenyl-phenylether	.70033		.55838	.48416		.44124	•	1.104	.54172	19.052
4-Nitroeniline	. 19049	.26381	.34622	.35978	.29043	.30434	•	1.123	.29251	20.955
2,4,6-Tribromophenol	. 05525	.04783	.09432	.18885		.18995	•	1.149	.11971	-53.071
1,2-Diphenylhydrazine	-	-	•	•	•	•	-	•	•	-
Alpha-BHC	•	-	-	-	•	, -	-	-	•	•
Beta-8HC	-	•	-	-	•	•	-	-	•	•
Gamma-8hi	-	-	-	-	•	•	-	-	•	•
Delta-Brī	-	•	•	•	-	•	-	-	•	•
Heptachlo:	-	•	-	-	-	•	-	-	•	•
Aldrin	•	•	-	-	-	•	-	-	•	
N rosodipheny'amine	.66180	.59474	.52737	.51835	.49727	.43835	-	. 892	.53965	14.501
4,6-Dinitro-2-hethylphenol	.04042	.13809	.13807	.14161	.13462	.11258	-	. 890	.11757	33.351
4-Bromophenyl-phenylether	. 28515		.22632	. 24884	.22658	.22460	-	.940	.24162	9.633
Hexachlorobenzene	.35723	.31963	. 28898	.30811	. 29341	.29140	-	.957	.30979	8.405
Pentachlorophenol	•	.07634	.10363	.13261	.13937	.15397		.996	.12119	25.618
Phenanthrene	1.24629	1.17708			1.10453		-		1.13087	5.951
Anthracene		1.16008			.93752	.90200	•		1.06434	13.064
Di-n-Butylphthalate		2.06220				1.79727	-		1.93436	8.723
4,4'-Dibromobipheny:		1.71732				.39318	-		1.36857	38.289
Fluoranthene		1.15209				.97609	-		1.06699	6.904
Heptachlor Epoxice	•	-	-	-	-	-	•	-	-	•
Endosulfan j	-	-	-	-	-	•	-	•	-	
4,4'-DDE	-	-	•	•	-	-	•	-	-	_
Dieldrin		•	-	-	-	-	•	-	-	
Endrin	-	•	-	-	-	-	-	-	•	
4,41-003	-	•	-	-	-	-	-	-	•	
Endosulfan Il	-	-	-	-	•	•	-	•	•	-
Endriñ Flöehyce	-	•	-	-	-	-	-	-	-	-
4,4'-051	•	•	-	-	•	-	-	-	-	-

RF - Response factor (Subscript is amount in mg/L)

RRT - Average Relative Retention Time (RT Std/RT Istd)

Ri - Average Response Factor

XRSD - Percent Relative Standard Deviation

Calibration Report

Title: ID-625 ACID AND BASE/NEUTRALS + EtPHENOL, DNSBP62-NO2-4-MEPH Calibrated: 881005 13:47

	4	Files: >E58 RF	-	5808 kf	>E5809 RF	>E5806 RF	>E5810 RF	>E5811 RF	RF			
- ,	Compound	10.	00 7	5.00	4Ų.00	60.00	80.00	120.00	160.00	RRT	RF	2 RSU
Endosúlf	an Sulfate		.,					-		*		•
* 3 * * * * * * * * * * * * * * * * * *	hlorendate		*	• .	•	-	•	-	-		•	-
Benzidin		02	640 .	C0226	.06306	.10885	.28840	.27781	-	.876	.13113	94.409
Pyrene		1.85	297.1.	79553	1.75312	1.67239	1.99466	1.98083	-	.872	1.84158	6.934
Terpheni	1-d14			•	-	•	•	•	•	-	-	-
	zviphtha:ate	1.60	003 1.	47377	1.44434	.1.39715	1.65486	1.54314	•	.953	1.52222	6.342
	hloropenzidine				.21996			.27407	•	1.001	. 22025	22.176
Chrysere		1.10	268 .	97304	1.00292	.93093	1.03414	.98926	•	1.003	1.00549	5.824
Benzo(a)	Anthracene	1.30	205.1.	27386	-1.27117	1.27282	1.45018	1.49253	•	.998	1.34377	7.470
bis(2-Étl	hy lhéxy I) Phtha la	te 2.03	965 1.	86521	1.80279	1.69046	1.94025	1.78283	•	1.018	1.85353	6.672
Di-n-oct	vlphthalate	4.94	331 À.	61780	4.39384	4.51639	4.35604	3.91135		.935	4.45640	7.626
Benzo(a)	Pyrene	1.07	293 1.	22156	1.25563	1.35870	1.28108	1.28923	-	.994	1.24652	7.732
Benzo(b)	Fluoranthere	1.57	709 1	63967	1.66090	1.96460	1.93675	1.79048	-	-,962	1.76158	9.216
Indeno(1	,2,3-cdlPyrene	1.11	499 1.	17465	1.15989	1.21579	1.18288	1.24246	•	1.148	1.18178	3.752
Dibenzo(a,h)Anthracene	.93	601 1.	00597	.99583	1.04693	.97837	1:01960	•	1.153	.99610	3.994
Benzo(k)	fluoranthene	1.37	168 1.	20488	1.13343	1.11601	1.13601	1.04182	•	.964	1.16721	9.651
Benzo(g,	h, i)Pery lene	.99	318 1.	07130	1.04962	1.10122	1.04774	.83611	-	1.191	1.01653	9.367

RF - Response Factor (Subscript is amount in mg/L)

RAT - Average Relative Retention Time (RT Std/RT 1std)

RF – Ruerage Response Factor

ARSS - Percent Relative Standard Deviation

8B SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

一 ・ ・ ・ ・ ・

						-	
_	e No.(Stand			•	Date A	Analyzed:	
Lab File	ID (Standa)	rd):	<u></u>		Time :	Analyzed:	· · · · · · · · · · · · · · · · · · ·
Instrumen	it ID:				• ,		
1		IS1(DCB)		IS2 (NPT)	1	IS3 (ANT)	
1		AREA #	•	AREA #		AREA #	! ! F
			===	****	******		===
	12 ·HOUR	19449	8.29	233344	11 12	124579	1
	STD				11.13	·	1 / 7
1	UPPER	10.0.000		1110:20			, —— .
į	LIMIT	138898		467688		249158	İ
		2:京世界完全主意的	*******				<u> </u>
į	LOWER LIMIT	3472		116922	!	62289	1
1	==========	::======	=::====	========	=====	========	! :===
	EFA SAMPLE			İ	•	İ	İ
-	NO.	•					!
01	981940	93403	_	365094	リーニーニー	190785	
02	1941	87941	8.27		11.77	179083	17.
03	1442	111988	8.29	427766	11.78	237296	177
04	1898	63863	8.27	24/6//	11.77	119860	177
05 06					<u> </u>		<u> </u>
07 !							¦
oe!							· ——
Cè :							
10!							
11; 12;							
13							' ——
14/							
15							
16; 17;							! ——
13;							<u> </u>
13.	·						
2.31							
211							
20: IS1 /1	$\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}$	 ichlorober	7900-61		PER LIY	(।
IS2 (::		halene-d8	=2115=U.			standard 3	, 3 122
ISC :	= Acena	phthene-d8	}		WER LIN		, c

page of

8C SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

ab Name: Engine:	enng Scie	nce	Contract:	ORØ	<u>Ø.1</u>	•
ab Code:					Job No.	
Sample No. (Stan	dard): 2	5mg/4		Date 3	Analyzed:	•
b File ID (Stànda	rd): E	5806	~ .	Time A	Analyzed:	•
nstrument ID:	,				-	
,			The Capital	•	764 (5511)	
	IS4 (PHN) AREA #	RT	ISS(CRY) AREA #	RT	IS4(PRY) AREA #	
12 HOUR STD	139346 69449	8.29	100732 233877	30.2] #\$3	60626 1 24579	34.94 17.24
UPPER LIMIT	358692		201464		121252	
LOWER LIMIT	89673	•	50366		<u>30313</u>	
EPA SA 1PLE NO.					·	
01 9308/940 02 194/ 03 194/2		21.82		30.19 30.19 30.22	79272	34.92 34.93 34.96
04 1898 05	19/559	2181	111736	30/8	(-3858	3491
07						
12		******				
1:						
16						
22 IS4 (PHN) = Phon IS3 (CRY) = Chry	enthrene-di sene-di2	.0		PER LIV	MIT = + 100 mal standal	
	ene-d12		1. 1. 0.1	WER LIP inter	MIT = - 508	ī .

2490 FORM VEID SW-1

page. __ of __

LATILE CONTINUING CALIBRATION CHECK Name: ... Contract:____ Code:____ Case No.:____ SAS No.:___ strument ID:CARBOPAK_____ Calibration Date(s):8/29/50 AB FILE ID: 25,29____ Init. Calib. Date(s):8/19/56, 8/15/86 MPOUND RRE RRF50 %D 0.08 ≅nzyl čhloride___ 0.08 0.00 s (2-chorcethoxy) ethane___ 0.04 100.00 is (2-chorotsopropy) tomobensene____ 0.26100.00 1.20 1.21 0.68 romodichleromethane____ 2.45 5.68 33.43 archofurm____ 1.45 0.81 44.43 omomethana____ 0.26 0.23 10.38 årbon tætrachloride_____ 3.20 2.46 23.24 hloroacetaldehyoe____ ERR Jorobenze € 1.35 1.17 14.33 Lionoethene 0.55 0.38 30.57 hlorofora. 3.48 22.62 Chárohexana Chlaraethyl suby, ether_ 0.92 0.74 19.13 0.04 100.00 hloromethane____ 0.34 27.66

0.17

3.99

3.90

2.98

2.48

1.94

2.47

0.54

1.95

2.33

2.44

1.51

4.21

2.70

3.08

100.00

20.96

23.16

18.63

19.35

12.92

13.66

15.03

37.50

21.48

12.77

0.61

24.73

28.23

16.00

31.33

15.94

35.57

28.26

37.07

100.00

3.15

3.00

2.42

2.00

1.69

2.13

1.66

1.46

1.92

1.32

4.18

,2_Dichloropropane____ 2.03 3_Dichloropropylens____ 4.60 3.30 1,2,2_Tetraction bethane_ ,1,1,5_Tetraction bethane_ 6.65 5.59 3.61 2.48 etrachiores viese 6.65 5.59 1,1_Trich) w oeshane____ 2.20 1.40 1,2_Trichloroethane____ 4.60 3.30 achlorumin, lene_____

ploromethyl methyl ether_

___,m__,& p_Chlorotoluenes _

ıbromomethanı

bromochloromethane____

2_Dichlorobenzene_____

3_Dichlorobenzene____

,4_Dichlorobenzene____

rchlorodifluormethane____

,2_Dichloroethane_____ ,1_Dichloros*hylene____

ans_1,2_dichloroethylene

1_Dichloroethane____

🤏 chloromethane ____

anyl although a

Proposition of the second

4.40 3.55 19.24 ichlorofluthmethame_____ 1.23 1...9 43.70 L.blocomor. 3.59 2.42 32.54

0.65

2491

TILE CONTINUING CALIB	RATION CH	ECH;		
Name: ENGINEERING SCIENC	E	Contr	act:	***************************************
Code: Case No.:	SAS	No.:	SDG No	.:
trument ID.:CARBOPAK Ca	libration D	ate(s):8	/2 9/88	
FILE ID: RRF 5028	·····		Inilal	calibratur 8/19/68
<pre> Pours </pre>	RRF	RP550	%D	
าวอกค	3.10			
lorouenzene	5.31	4.20	-20.90	
P_Dichlerobenzens	2.44	3.13	28.77	
I_Dichlorobenzene		3.43		
- Du chomopendene		3.60		
vi Benrene				
1677		3.39	-2.43	